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Geology of the
Cedartree Lake Area

District of Kenora

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By
J. C. Davies and J. A. Mahn

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(back pocket)

Map 2319 (coloured)–Cedartree Lake Area, Kenora District.
Scale 1 inch to ½ mile (1:31,680)

CHARTS

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Chart A–Figures 2, 4, 5 and 7

ABSTRACT

The report summarizes the geological features of the Cedartree Lake map-area, District of Kenora, which is about 35 miles (56 km) southeast of Kenora.

The rocks in the map-area are steeply dipping, Early Precambrian, mafic metavolcanics overlain by a complex of intermediate to felsic metavolcanics, intruded by differentiated mafic to ultramafic sills. Lenticular to irregularly shaped gabbro intrusions occur in the mafic metavolcanics. The Stephen Lake dioritic pluton has intruded the metavolcanic sill complex.

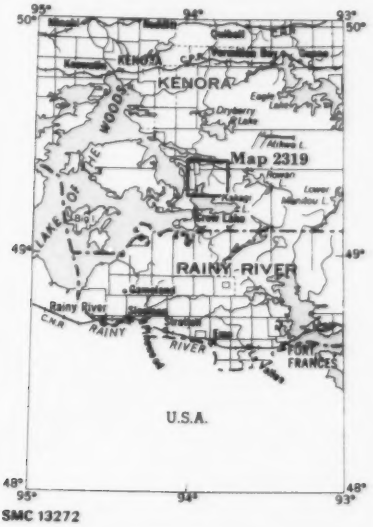

Figure 1–Key map showing location of the Cedartree Lake area. Scale, 1 inch to 50 miles (1:3,168,000).

Mafic metavolcanics to the west of the map-area have been intruded by the Aulneau granitic batholith and porphyry dikes and plugs related to this batholith have intruded the metavolcanic rocks of the map-area. The Early Precambrian rocks are intruded by one northwest-trending diabase dike.

The rocks have been folded into a major anticline and syncline with east-northeast-trending vertical axial planes. These folds are truncated by a major west-northwest-trending fault with right-handed movement. The main foliation developed is schistosity in zones of shearing.

Gold occurrences in the map-area are associated with quartz veins, shear zones, porphyry dikes and plugs. Minor molybdenum mineralization is associated with the Stephen Lake Pluton and the Wapus Lake porphyry plug. Copper mineralization occurs below a gabbro sill south of Little Stephen Lake and zinc-copper mineralization occurs in dacitic tuff west of Weisner Lake.

Geology

of the

Cedartree Lake Area

District of Kenora

by

J.C. Davies[1] and J.A. Morin[2]

Introduction

The Cedartree Lake area is bounded by Latitudes 49°22′30″N and 49°15′N, and Longitudes 93°45′W and 94°00′W. The centre of the map-area is about 35 miles (56 km) southeast of Kenora, and 14 miles (23 km) southeast of the town of Sioux Narrows.

The western part of the map-area is accessible from Highway 71; the central and southwestern parts by boat on Kakagi Lake and the northern and eastern parts by boat on Dogpaw Lake and Caviar Lake.

Present Geological Survey

The map-area was mapped at a scale of 1 inch to ¼ mile (1:15,840). The mapping method consisted of examination of almost all exposed rock outcrops in the map-area located principally from aerial photographs. Geological data were plotted in the field on acetate overlays on the aerial photographs supplied by the Silviculture Section, Ontario Division of Forests, Ministry of Natural Resources. This data was transferred to cronaflex base map sheets (scale 1 inch to ¼ mile) supplied by the Cartography Section, Ontario Division of Lands, Ministry of Natural Resources.

Prospecting and Mining Activity

Exploration work in the area was carried out for gold in the late 1800s. Numerous gold deposits were discovered at that time and two short-lived mines were developed, the Gold Panner Mine on Caviar Lake in 1899 and the Flint Lake Mine on Flint Lake

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in 1901. All subsequent economic activity has been concerned with gold properties, except for relatively recent interest in base metal mineralization possibly associated with the mafic to ultramafic sills and the felsic metavolcanics.

Previous Geological Work

The map-area adjoins the Atikwa Lake map-area to the northeast (Davies 1973) and the Rowan Lake area to the east (Kaye in press); both areas were mapped at a scale of 1 inch to ¼ mile (1:15,840). Other geologists who mapped and commented on the area include W. McInnes (1902) and A.C. Lawson (1885). E.M. Burwash (1933) mapped the Cedartree Lake area and adjacent areas for the Ontario Department of Mines at a scale of 1 inch to 1 mile (1:63,360). His report and map have been used extensively by prospectors in the area.

Topography

The topography of the map-area is highly dependent on the type of bedrock. The area predominantly underlain by mafic metavolcanics is low and undulating with relief not exceeding 50 feet (15 m). It is also characterized by few bedrock exposures. The rest of the map-area is underlain by mafic to ultramafic sills, intermediate to felsic metavolcanics, and felsic intrusions, and is characterized by good bedrock exposure, hills that are elongated parallel to the trend of the rock units, and relief that varies from 50 feet (15 m) to 400 feet (120 m). The major lakes in the map-area drain to the north into the Flint Lake-Dogpaw Lake-Caviar Lake system. Weisner Lake, Jessie Lake, and Wicks Lake drain south into Kakagi Lake.

Acknowledgments

The authors acknowledge very competent field assistance from T.H. Dixon, K.G. Sutton, and G.D. Trick, each of whom performed independent geological mapping during the field season.

GENERAL GEOLOGY

Precambrian

ARCHEAN

The oldest rocks in the map-area consist of a series of mafic metavolcanics overlain by a complex of intermediate to felsic metavolcanics with interlayered mafic to ultramafic sills. This sequence was deformed into folds with steeply dipping limbs and vertical, east-northeast-trending axial planes and which was then intruded by a diorite

Table 1 | TABLE OF LITHOLOGIC UNITS FOR CEDARTREE LAKE AREA

PHANEROZOIC

CENOZOIC

QUATERNARY

RECENT

Swamp and stream deposits

PLEISTOCENE

Sand, gravel, boulders, clay

Unconformity

PRECAMBRIAN

MIDDLE TO LATE PRECAMBRIAN (PROTEROZOIC)

MAFIC INTRUSIVE ROCKS

Diabase

Intrusive Contact

EARLY PRECAMBRIAN (ARCHEAN)

Late Mafic Dikes

Gabbro, diorite, lamprophyre

Intrusive Contact

FELSIC INTRUSIVE ROCKS

Late Felsic Intrusive Rocks

Foliated and massive granodiorite, massive diorite, contaminated diorite

Intrusive Contact

Early Felsic Intrusive Rocks

Granodiorite, feldspar porphyry, quartz porphyry, quartz-feldspar porphyry, fine-grained granodiorite and aplite

MAFIC AND ULTRAMAFIC INTRUSIVE ROCKS

Gabbro, diorite, quartz gabbro, anorthositic gabbro, pyroxenite, peridotite orthopyroxenite

Intrusive Contact

METAVOLCANICS AND METASEDIMENTS

Metasediments

Volcanic sandstone, volcanic conglomerate, argillite, chert

Felsic to Intermediate Metavolcanics

Dacite, porphyritic dacite, rhyodacite, tuff-breccia, lapilli-tuff, tuff, ignimbrite, spherulitic ash flows

Mafic to Intermediate Metavolcanics

Andesite, basalt, coarse-grained basalt, tuff-breccia, lapilli-tuff, tuff, flow breccia, pillow breccia, porphyritic andesite, pillow lava

stock and quartz feldspar dikes. The mafic metavolcanics comprise over half of the rocks in the map-area and underlie most of the western and northern parts of the map-area. They consist mainly of pillowed basalt flows with minor interbedded pyroclastic units. The mafic metavolcanics are intruded by lenticular to irregularly shaped bodies of gabbro.

The complex of metavolcanics and sills occurs in the central and southern parts of the map-area. The metavolcanics consist of a basal series of intermediate tuff-breccia, and an upper series of fine-grained, typically well-bedded, dacite to rhyolitic tuff with minor interbedded volcaniclastic sediments. The metavolcanic sequence has been intruded by five mafic to ultramafic sills, four of which have differentiated into gabbro and peridotite, and pyroxenite units.

Quartz and quartz-feldspar porphyry dikes and plugs have intruded the above sequence of rocks, especially the mafic metavolcanics. They are probably related to the large Aulneau granitic batholith which is adjacent to the map-area on the western side. The porphyries are associated with occurrences of gold mineralization in the map-area.

The Stephen Lake Pluton, in the southeastern part of the map-area intrudes the metavolcanic and sill complex. The pluton is epizonal in character and ranges in composition from granodiorite to augite diorite. Associated minor gold, molybdenum, and sulphide mineralization occur within and at the contact of the pluton.

The northwest-trending Middle to Late Precambrian diabase dike is present in the eastern part of the map-area. No mineralization was noted associated with the dike.

The rocks in the western, central, and southern parts of the map-area have been folded into an anticline and syncline with vertical axial planes trending east-northeast and hinge zones plunging steeply to the east-northeast. The fold structures are truncated to the northeast by a major northwest-trending fault extending through Dogpaw Lake, Flint Lake, and the eastern part of Stephen Lake. Movement in the fault seems to be right-handed but magnitude of the displacement is unknown. On the northeastern side of the fault, the mafic metavolcanics are folded into an anticline with northeast-trending vertical axial plane and hinge zone plunging steeply to the north-northeast.

Mineralization in the map-area mainly consists of gold associated with quartz veins, shear zones and porphyry dikes. Minor molybdenum mineralization is associated with the Stephen Lake Pluton and the large porphyry body at Wapus Lake. Copper mineralization has been found in a shear zone southeast of Derry Lake and in dacite tuff at the base of a gabbro sill south of Little Stephen Lake. Zinc-copper mineralization is present in dacitic tuff on the northwest side of Weisner Lake.

Metavolcanics

MAFIC TO INTERMEDIATE METAVOLCANICS

Mafic to intermediate rocks account for more than half of the exposed rocks in the map-area. Mafic volcanic rocks, predominantly basaltic flows, with minor interbedded tuff and lapillistone units underlie much of the western and northern part of the map-area. Where traceable some of these minor pyroclastic units can be used as crude marker units.

The basaltic rocks are dark green on the fresh surfaces. On the weathered surfaces these rocks are pale greenish brown and fine- to medium-grained ophitic texture can usually be discerned. The rocks are massive and lack a penetrative foliation except in

areas affected by shearing. Pillowed lavas are abundant and other primary structures present include scoriaceous flow tops, aquagene breccia and pillow breccia.

Top determinations were made from the pillow lavas in which the pillows usually have length to width ratios of about 3:2. In some areas, the pillows have been deformed and top determination was not possible. It was not possible to trace out and map individual flow units because the contacts are obscured by overburden.

Representative basalt samples were examined in thin section. The rock samples were found to be in varying stages of metamorphic alteration. Near the eastern contact of the Aulneau Batholith just west of the western edge of the map-area, the basalt is metamorphosed to a fine- to medium-grained amphibolite with a mineral assemblage of plagioclase, hornblende and quartz. The basalt has a slaty cleavage and minor kink banding is present along the foliation planes. Thin irregular stringers of epidote-quartz are also present.

In areas of less intense shearing, the basalt is fine-grained with a mineral assemblage of plagioclase, uralite hornblende, and magnetite. In areas where shearing is absent, the basalt is fine- to medium-grained with a mineral assemblage of plagioclase, augite with uralite alteration, and magnetite.

Mafic tuff, lapillistone and tuff-breccia occur in two main units in the map-area: a unit of mafic tuff and lapilli-tuff west of Jessie Lake and a unit of lapillistone and tuff-breccia south of Caviar Lake. The Jessie Lake unit is about 200 feet (60 m) thick and over 12,000 feet (3,650 m) long. It is conformable to the trend of the formations above it. The Caviar Lake unit ranges from about 300 feet (90 m) to 700 feet (210 m) thick and is over 13,000 feet (3,900 m) long. The unit is highly sheared and is folded into an anticline with a northeast-trending vertical axial plane. Both units weather pale brown to greenish brown with dark mafic clasts.

Metavolcanic flows of intermediate composition are rare in the map-area. They are distinguished from basaltic flows by a lighter colour of their weathered surface. A lensoid unit of flow-breccia andesite occurs in the extreme northwestern part of the map-area by Highway 71.

FELSIC TO INTERMEDIATE METAVOLCANICS

Felsic to intermediate metavolcanics occur in the central and southern parts of the map-area. For the most part, these metavolcanics are dacitic in composition (60 percent to 70 percent SiO_2) and they occur intercalated between the mafic to ultramafic sills. Felsic metavolcanics of true rhyolitic composition are of restricted occurrence in the map-area and most of the 'felsic looking' metavolcanics are dacitic in composition. The metavolcanics which tend more toward an intermediate composition (based on higher colour index) are the pyroclastic rocks west and south of Bog Bay of Cameron Lake in the southeastern part of the map-area.

Cedartree Lake-Emm Bay-Peninsula Bay Felsic Metavolcanics

The felsic to intermediate metavolcanics southwest of Cedartree Lake and along the northern part of Kakagi Lake (Emm Bay, Peninsula Bay) are relatively undeformed

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Photo 1–Dacitic tuff-breccia, north of Peninsula Bay, Kakagi Lake.

and consist mainly of dacitic tuff-breccia (Photos 1 and 2). The tuff-breccia is essentially homogeneous across the area in contrast to the tuff-breccia north of Cedartree Lake. It is made up of large, pale green, buff and cream coloured clasts enclosed within a similarly coloured fine-grained tuffaceous matrix. The clasts range from rounded to subangular in shape and range up to 4 feet (1.2 m) in diameter. The stratigraphy of the unit is fairly uniform. It consists of tuff-breccia sub-units made up of varying proportions of breccia-size clasts and minor sub-units of fine-grained tuff. These sub-units, however, do not have consistent trends, are not continuous over long distances, and therefore are not easily mapped.

This particular unit of dacitic tuff-breccia has been included in a study of D.R. Smith (1971), on the felsic volcanic breccias of the Kakagi Lake area. He concluded that the pyroclastic material has been deposited suddenly either subaerially or in a shallow water environment. The great range in clast size and irregularity in stratigraphy tend to confirm this conclusion.

Chemical analyses of the matrix and clasts of the tuff-breccia (Smith 1971) indicate a "consistent variation between fragments and adjacent matrix in degree of differentiation. The fragments have a higher differentiation index than the matrix. There is also a consistent variation in the weight percents of the oxides SiO_2, MgO, and FeO, with the former being enriched in SiO_2 and impoverished in MgO and FeO when compared to the matrix and is basically a function of the stage of crystallization". The chemical composition range and average of clasts and matrices of twelve samples of tuff-breccia sampled from the above unit within the map-area is given in Table 2.

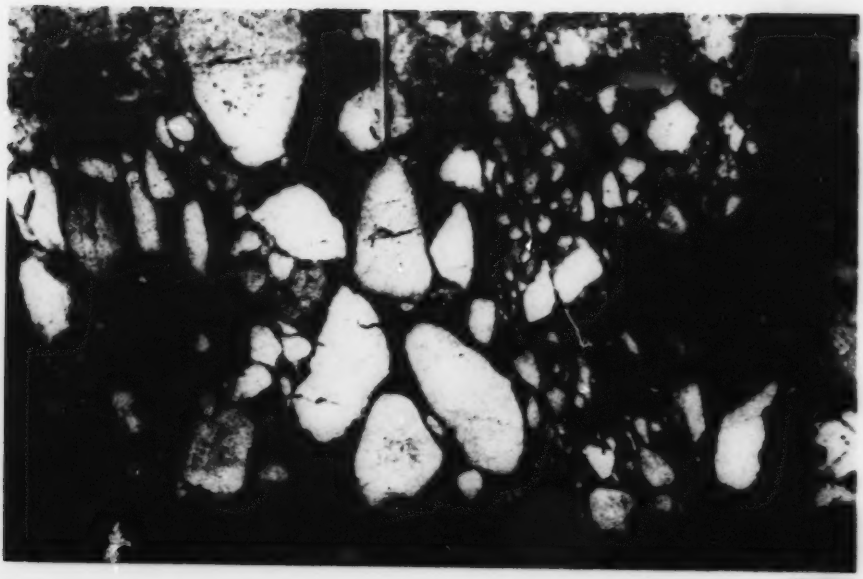

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Photo 2–Dacitic tuff-breccia on island in west-central Cedartree Lake.

Dogpaw Lake-North Cedartree Lake Intermediate Metavolcanics

The felsic to intermediate metavolcanics southwest of Dogpaw Lake and north of Cedartree Lake consist mainly of tuff-breccia with minor tuff and lapillistone layers. They are probably a more mafic facies of the Cedartree Lake-Emm Bay-Peninsula Bay tuff-breccia described earlier.

The unit is very heterogeneous across the area. Large subangular clasts of mafic to intermediate composition are enclosed in a fine-grained greyish green tuffaceous matrix

Table 2 CHEMICAL COMPOSITION RANGE AND AVERAGE OF CEDARTREE LAKE-EMM BAY-PENINSULA BAY FELSIC METAVOLCANICS (FROM SMITH 1971)

	CLASTS	MATRICES
SiO_2	67.13 (62.29-71.92)	65.10 (61.49-72.59)
Al_2O_3	16.14 (13.92-18.41)	15.88 (13.72-17.71)
FeO	3.13 (1.27-7.03)	6.34 (2.38-8.09)
CaO	4.47 (2.09-8.53)	4.50 (1.67-6.91)
MgO	1.80 (0.79-3.45)	3.22 (0.99-4.22)
Na_2O	4.05 (2.79-6.11)	3.38 (1.87-5.12)
K_2O	1.83 (0.69-2.67)	1.33 (0.49-2.66)
TiO_2	0.45 (0.14-0.57)	0.54 (0.37-0.60)
MnO	0.07 (0.03-0.14)	0.13 (0.04-0.20)

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Photo 3–Mafic clasts within dacitic tuff matrix, southwest shore of Dogpaw Lake.

(Photo 3). The rocks are massive except for those in the vicinity of the Dogpaw Lake Fault, where they are highly sheared and altered and the clasts are greatly elongated (Photo 4). Irregular tuff layers are not continuous; in some locations they form lensoid units 50 feet (15 m) long and 1 foot to 2 feet (30 cm to 60 cm) thick.

Cedartree Lake-Wicks Lake Felsic Metavolcanics

The felsic metavolcanics northeast and south of Cedartree Lake and northwest of Wicks Lake are primarily well-layered, fine-grained dacitic tuff. The tuff is usually cream coloured on the weathered surface and pale grey on the fresh surface. The layering ranges in thickness from a fraction of an inch to several feet. The very thinly layered units in the tuff sequence are probably tuff-derived waterlaid sediments (Photo 5).

Stephen Lake-Little Stephen Lake-Weisner Lake Felsic Metavolcanics

The Stephen Lake-Little Stephen Lake-Weisner Lake group of felsic metavolcanics is similar to the Cedartree Lake-Wicks Lake group. The group consists mainly of dacitic tuff with associated tuff-derived sediments such as chert, siltstone and sandstone. Among

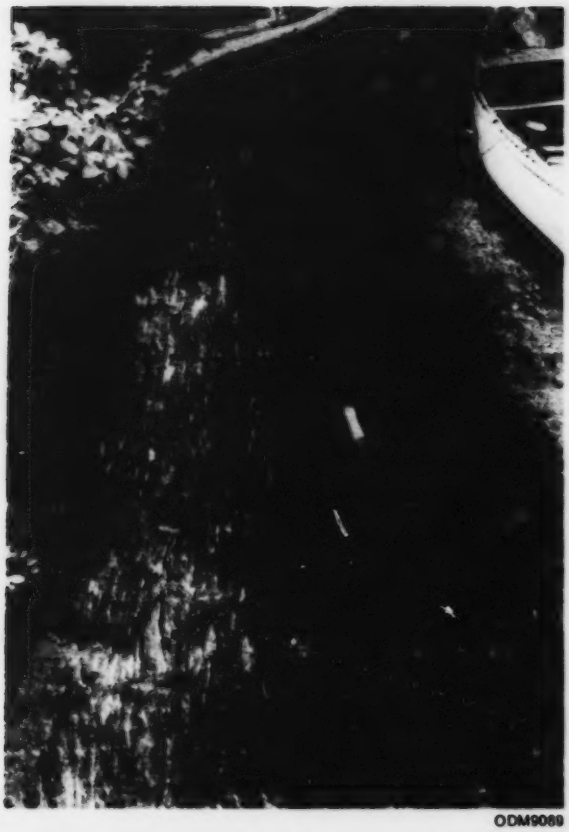

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Photo 4—Highly sheared and elongated mafic to intermediate tuff-breccia, northwest shore of Dogpaw Lake.

the well preserved primary sedimentary structures that occur in the tuffs and sediments are load casts, slump bedding, and graded bedding. Spherulites are present in some of the tuff units. An ignimbrite flow and dacite flows with remarkable flow banding are interbedded with the tuffs and sediments.

The dacite flows are creamy white to grey on the weathered surface and black on the fresh surface. They are massive and break with a pronounced conchoidal fracture. They are distinguished from tuffs on the basis of their aphanitic grain size and their flow banding. The average thickness of the flows was not determined exactly but is probably about 50 feet (15 m) to 100 feet (30 m).

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Photo 5–Dacitic tuff-breccia, north shore of Mongus Lake.

An ignimbrite flow unit is located north, west, and south of Little Stephen Lake. It ranges from 200 feet (60 m) to 400 feet (120 m) in thickness and is continuous over 15,500 feet (4,700 m). It consists of large, angular, blocky, porphyritic rhyodacite clasts embedded in a fine-grained equally porphyritic rhyodacitic matrix. Features of the unit which suggest an ignimbritic origin are the monolithologic clasts and matrix, the fairly constant thickness and considerable lateral extent, the absence of sorting, and the angular shape of the clasts. A rusty gossan zone and an EM conductor are located along the top of the ignimbrite for most of its length.

Fine-grained massive ash flows or ignimbrites also occur on the peninsula north and west of Stephen Lake, with thicknesses ranging from 50 feet to 100 feet (15 m to 30 m). They are more massive than the similar composition tuffs situated above and below them, and were probably internally welded during emplacement.

Bog Bay-Mongus Lake Felsic to Intermediate Metavolcanics

Intermediate metavolcanics occur west and south of Bog Bay. A large proportion of the pyroclastics in this area are fine-grained tuffs. The colour index of these tuffs is greater than that of all the other tuff units within the map-area classified as felsic to intermediate and the composition is therefore probably intermediate. The tuff is typically pale green and massive with no traces of primary layering. Subtle compositional differences in the eastern part of the area have indicated that the strike of the units may be to

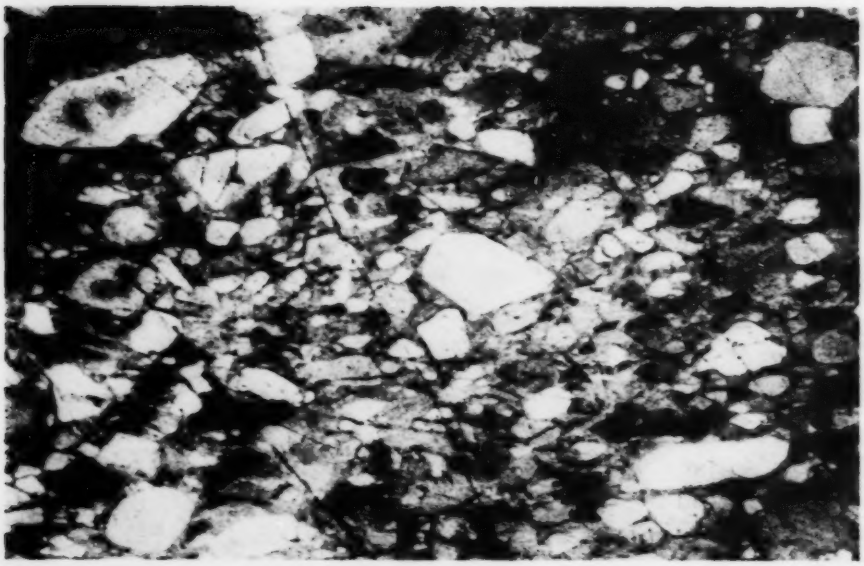

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Photo 6–Volcanic conglomerate on island in northern tip of Cedartree Lake.

the southeast, but these trends are not definite. Tuff-breccia has also been mapped within the tuff sequence where larger clasts predominate.

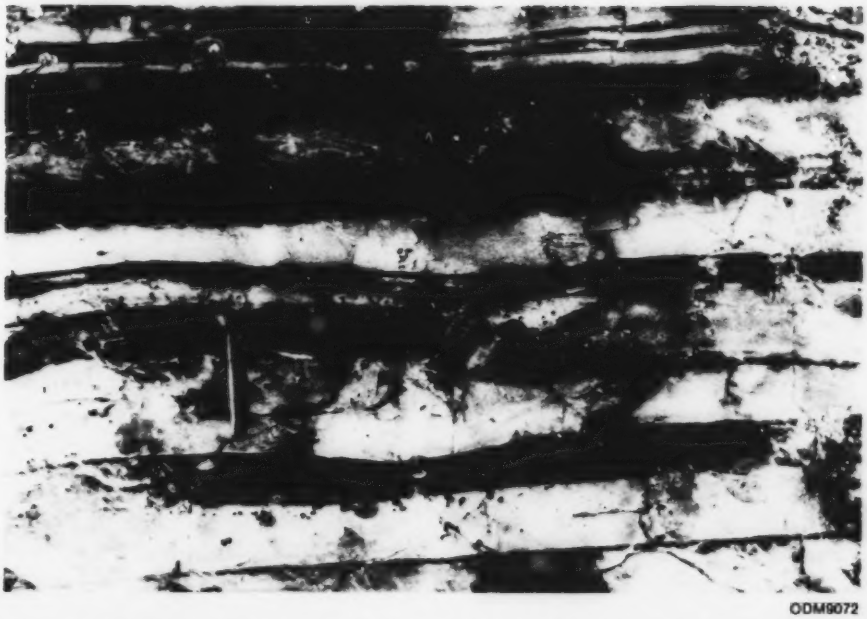
In the area just north of Mongus Lake are dacitic metavolcanics which consist mainly of tuff-breccia made up of poorly sorted, large, subangular clasts within a fine-grained tuffaceous matrix (Photo 5).

Metasediments

Metasediments in the map-area include cherty sediments, argillite, volcanic sandstone and volcanic conglomerate. These rocks occur in thin conformable units within the intermediate and felsic to intermediate metavolcanic sequences.

The volcanic conglomerate occurs as discontinuous units usually interbedded with tuff-breccia. The clasts in the conglomerate are large, of varied composition ranging from felsic to mafic, poorly sorted and rounded to sub-rounded (Photo 6). They are especially well exposed in the tuff-breccia sequence around Cedartree Lake. The volcanic conglomerate is not always shown on Map 2319 by a separate code where it is closely associated with the tuff-breccia.

The cherty sediments occur as thinly bedded, dark hard siliceous units that are usually less than a foot (30 cm) in thickness (Photo 7). They are usually interbedded with volcanic sandstone and argillite. Primary sedimentary deformation structures such as



ODM9072

Photo 7–Interbedded cherty sediments and volcanic sandstone, west of Pictograph Point, Stephen Lake.

load casts are preserved in the cherty sediments (Photo 8). Cherty sediments primarily occur interbedded within the dacitic tuff sequence around Stephen Lake.

Argillite occurs as thinly bedded, soft grey weathering units that are usually only a few feet in thickness. They occur interbedded with cherty sediments and volcanic sandstone primarily within the dacitic tuff sequence around Stephen Lake.

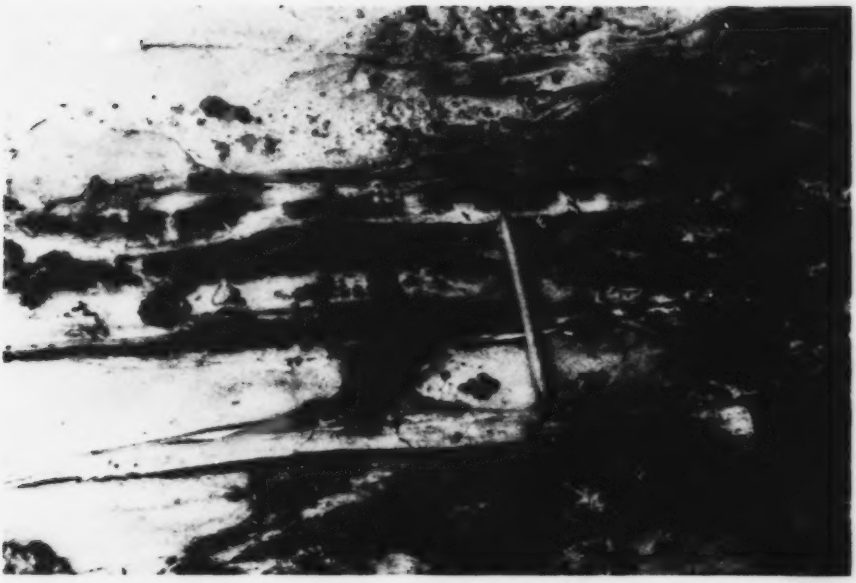
The volcanic sandstone occurs as thin, pale coloured beds a few inches in thickness that are interbedded with cherty sediments and argillite within thick sequences of dacitic tuff. It occurs in the area around Stephen Lake.

Intrusive Rocks

MAFIC AND ULTRAMAFIC ROCKS

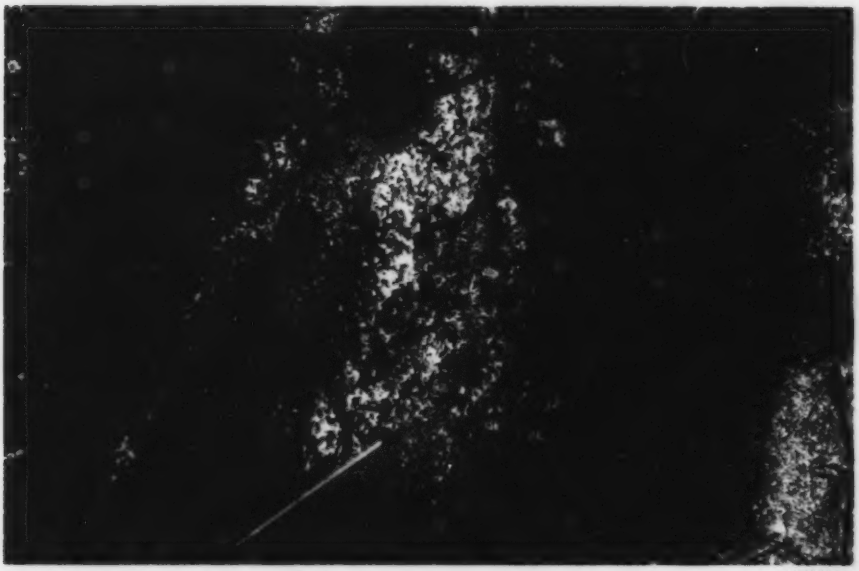
Mafic and ultramafic intrusive rocks occur in two different geological environments in the map-area. They occur as (1) irregular podlike intrusions into the basaltic pile and (2) as differentiated sills within the intermediate to felsic metavolcanic sequence.

The first type of gabbro intrusion is restricted to the area of basalt in the western part of the map-area. The gabbro ranges from dark brown to greenish grey on the weathered surface. It is massive and typically medium- to coarse-grained with white feldspar and black to dark green amphibole grains. The intrusions are irregular in shape and discordant relative to the local structure.



ODM9073

Photo 8–Primary sedimentary load casts within cherty sediments and dacitic tuff, west of Pictograph Point, Stephen Lake.



ODM9074

Photo 9–Pegmatitic gabbro phase in orthopyroxenite of Sill No. 1, main peninsula in Emm Bay, Kakagi Lake.

Cedartree Lake Area

Five mafic to ultramafic sills of the second type occur within the map-area. They are described below.

Sill No. 1 is located south of Dogpaw Lake, through Emm Bay and south of Peninsula Bay. It varies in thickness from 2,500 feet (760 m) at the west end of Peninsula Bay to 4,500 feet (1,370 m) by the Cedartree Lake-Emm Bay Portage. It is the most heterogeneous of the sills because the ultramafic rocks not only occur in a zone at the base of the intrusion but are also concentrated in conformable lenses within the gabbro. The gabbro is grey to dark grey, medium- to coarse-grained equigranular massive rock with some pegmatitic grain size phases (Photo 9). The peridotite and the pyroxenite are dark rusty brown on the weathered surface and black on the fresh surface (Photos 10 and 11).

Sill No. 2 is located through the middle of Cedartree Lake, north of Peninsula Bay and west of Wicks Lake. The faulted sills segment west of Weisner Lake and east of Wicks Lake is probably a faulted segment of Sill No. 2. The sill varies in thickness from 1,000 feet (305 m) in the middle of Cedartree Lake to 2,500 feet (760 m) north of the west end of Peninsula Bay. The sill consists of coarse- to very coarse-grained massive gabbro with a basal layer of pyroxenite that ranges up to 450 feet (135 m) in thickness. The basal layer of pyroxenite is continuous over most of the length of the sill.

The senior author (Davies 1966) reported on the petrography, mineralogy and chemical composition of rock samples selected from Sills No. 1 and No. 2 (Table 3). He made the following observations on the peridotites:

> Both peridotite and picrite weather black to dark brown. The presence of plagioclase is determined with difficulty in hand specimens so that distinction between peridotite and picrite is unreliable in the field. Olivine and derived serpentine can be recognized in most specimens, and together with the dark weathered surface serve to distinguish the rocks from the pyroxenites.
>
> Orthopyroxene forms the coarsest grains in the peridotite and picrite, but not all of the grains are coarse and most are subhedral or anhedral. Many grains are equidimensional; some display elongation parallel to C. Small crystals of olivine and plagioclase occur in a few orthopyroxene grains.
>
> The olivine grains are rounded and, where clustered, are closely packed together. Dark reddish brown amphibole envelopes most olivine grains. Subhedral grains of plagioclase and equidimensional grains of clinopyroxene lie between the grains of olivine and orthopyroxene.
>
> Olivine was probably the first mineral to crystallize. The plagioclase and clinopyroxene probably began to crystallize later than orthopyroxene but textural relationships suggest a period of simultaneous crystallization of all three minerals. The amphibole which rims the olivine is interpreted as the product of reaction between the olivine and the final liquid fraction.

In his discussion of the pyroxenites, Davies (1966) noted the following:

> The pyroxenites are dominated by large euhedral hypersthene grains, or their pseudomorphs, which volumetrically constitute 50 to 75 percent of the rocks. Clinopyroxene and plagioclase lie between the hypersthene grains. Quartz, hornblende and magnetite are present in small amounts in most of the specimens examined. Olivine is absent from these rocks.
>
> Each of the constituent minerals is similar in composition and habit to the corresponding minerals of the peridotites and picrites, with the exception of the amphibole which is bluish green. The quartz occurs adjacent to the plagioclase and has slightly replaced the plagioclase in most rocks. Alteration of the primary minerals is virtually identical in the pyroxenites, peridotites, and picrites. The plagioclase of the pyroxenites is altered to sericite in addition to the dark, fuzzy mass.

ODM9075

Photo 10–Peridotite of Sill No. 1 with joint pattern due to shrinkage (?), island in Emm Bay, Kakagi Lake.

ODM9076

Photo 11–Carbonatized zone at base of peridotite of Sill No. 1, island off northwest end of main peninsula, Emm Bay.

Table 3 CHEMICAL ANALYSES OF PYROXENITES AND PICRITES (PLAGIOCLASE BEARING PERIDOTITES) OF THE SILL No. 1

	K3	K4	K9
SiO_2	53.04	48.04	45.60
Al_2O_3	6.48	6.56	6.13
Fe_2O_3	0.99	1.47	4.57
FeO	10.09	8.01	7.08
MnO	0.26	0.20	0.21
MgO	21.76	20.26	26.15
CaO	5.34	10.94	4.57
Na_2O	0.63	0.40	0.34
K_2O	0.11	0.07	0.09
TiO_2	0.36	0.24	0.29
P_2O_5	0.09	0.05	0.07
Cr_2O_3	—	0.42	0.33
H_2O	1.11	2.09	4.83
	100.26	99.75	100.26

Davies also reported on five samples of the gabbroic phases of the two sills:

> Orthopyroxene forms the largest grains, but plagioclase crystallized early and inhibited the growth of the orthopyroxene. Some of the plagioclase and all of the clinopyroxene occurs as small crystals lying between the large orthopyroxene grains. Quartz is interstitial to all other minerals, and in the quartz gabbro it has replaced some of the plagioclase. The rocks are highly altered, but original igneous textures are visible.

Sill No. 3 is located on the eastern side of Cedartree Lake and northwest of Wicks Lake. The sill north of Mongus Lake may be a faulted segment of part of Sill No. 3. Sill No. 3 has been faulted extensively and its thickness ranges from 1,600 feet (490 m) south of Flint Lake to 3,300 feet (1,005 m) northwest of Wicks Lake. It consists of a basal layer of peridotite ranging up to 1,600 feet (490 m) thick, overlain by an upper zone of dark brown massive medium- to coarse-grained gabbro. No pegmatitic grain size phases were found.

Sill No. 4 is located west and south of Little Stephen Lake and south of Weisner Lake. It ranges from 200 feet (60 m) to 500 feet (150 m) in thickness and is entirely composed of medium-grained dark brown massive gabbro. The sill is probably a concordant offshoot of Sill No. 3. The eastern extension of Sill No. 4 is underlain by a gossan zone at the base of the sill which is in contact with underlying dacitic tuff.

Sill No. 5 is located south of the eastern part of Stephen Lake. The sill is 1,600 feet (490 m) thick and consists of a basal layer of 200 feet (60 m) of pyroxenite, an upper basal layer of 200 feet (60 m) of peridotite and an upper section consisting of 1,200 feet (360 m) of gabbro. The sill is cut off by a fault at the eastern end and at the western end where it is also complexly folded.

The mafic-ultramafic intrusions north of Stephen Lake and east of the south end of Flint Lake are all highly altered and it is difficult to ascertain their original lithology. Consequently, their correlation with the sills to the south of them is not certain.

EARLY FELSIC INTRUSIVE ROCKS

Dikes of quartz porphyry, feldspar porphyry and quartz-feldspar porphyry are common in the map-area. These vertical dikes are generally from 10 feet to 30 feet (3 m to 9 m) wide, cross-cut the local structure, and vary in length from a few tens of feet to several thousand feet. They weather to a white colour and are pink to brown on the fresh surface. The dikes increase in abundance west toward the Aulneau granitic batholith and they are probably genetically related to it.

A possible extrusive body of quartz-feldspar porphyry occurs north of Peninsula Bay of Kakagi Lake. The unit lies conformably within an intermediate tuff sequence and is over 2½ miles (4 km) long. In thin section, the rock consists of 40 percent euhedral feldspar phenocrysts, 5 percent euhedral quartz phenocrysts and 55 percent very fine grained quartz-feldspar groundmass.

Three plug-like bodies of quartz-feldspar porphyry occur in the map-area: at Wapus Lake, north of Corbett Lake, and east of Stephen Lake. Gold and molybdenum mineralization are associated with the largest of these, the Wapus Lake porphyry body, which is 1½ miles in diameter.

The porphyry dikes are restricted to the areas of mafic metavolcanics. The orientations of the dikes are random. A possible explanation for the association of the dikes with the mafic metavolcanics is that during folding the mafic metavolcanics fractured in a brittle fashion that was very favourable for poryhyry dike intrusion.

LATE FELSIC INTRUSIVE ROCKS

Stephen Lake Pluton

The Stephen Lake Pluton occurs south of Stephen Lake in the southeastern part of the map-area. It is about 12,000 feet (3,600 m) long and 8,000 feet (2,400 m) wide and trends in a north-northwest direction.

The pluton is in contact with felsic and intermediate metavolcanics and two mafic sills. Large angular xenoliths up to 50 feet (15 m) in length occur in the contact phase of the pluton. The xenoliths are conformable in bedding with the adjacent country rock. Xenoliths of gabbro also occur within the pluton, especially in the area north of Weisner Lake.

The main mass of the pluton consists of a massive medium- to coarse-grained rock with no visible foliation but it is typically fine-grained within a few hundred feet of its contact. Jointing is well developed and strikes parallel to the pluton's length and dips moderately to the northeast. The joints indicate the pluton probably plunges to the northeast at a moderate angle of 45 to 70 degrees.

The composition of the pluton is quite heterogeneous. It varies from a quartz diorite to an augite diorite. In thin section it consists of 50 to 70 percent euhedral laths of plagioclase that are moderately to highly sericitized. Most of the plagioclase is albite and Carlsbad twinned with some minor compositional zoning. The rest of the rock consists of varying amounts of brown biotite, brown to green hornblende, quartz (3 to 15 percent), microcline (very minor), magnetite and apatite. Subhedral grains of augite occur in some samples where they are always mantled and partly replaced by uralite horn-

blende. One highly altered phase of the pluton has a relict porphyritic texture with almost complete sericitization of plagioclase and uralization of augite and a fine-grained groundmass consisting of up to 40 percent quartz. Under the microscope, the fine-grained contact phase of the pluton has a well foliated granoblastic texture with 1 mm size grains of biotite, quartz and plagioclase within a very fine grained quartz feldspar matrix. The texture appears to have resulted from quenching caused by rapid changes in temperature or pressure. Molybdenum and gold mineralization are associated with the pluton.

The nature of the intrusion suggests that it is similar to the "porphyry copper" type intrusions in the western part of the North American continent, i.e. an epizonal, intermediate composition pluton with porphyritic phases, a high degree of mineral alteration, finer grained borders and associated economic mineralizaton.

PROTEROZOIC

Late Mafic Intrusive Rocks

A northwest-trending diabase dike occurs in the map-area. The dike is about 100 feet (30 m) wide in most places and consists of rusty weathering, dark brown, massive diabase ranging from coarse-grained texture in the middle of the dike to a fine-grained texture at the contacts.

Under the microscope, the rock is seen to consist of 0.5 mm to 10 mm size grains in an ophitic texture. The following is an approximate mode: plagioclase (45 percent), augite-hornblende (35 percent), quartz (15 percent), magnetite-ilmentite (5 percent), apatite (trace), chlorite (trace). Plagioclase forms extensively sericitized 1 mm to 6 mm euhedral laths which are sometimes surrounded by rims of secondary recrystallized intergranular albite. Augitic pyroxene forms stubby pale brown 1 mm to 2 mm subhedral to euhedral grains which are partly altered to pale greenish brown anhedral shreddy grains of hornblende. Quartz is present as intersertal anhedral skeletal grains which surround other grains. The quartz grains range up to 6 mm in size. Equant anhedral to subhedral 0.5 mm grains of magnetite-ilmenite form partial rims around the mafic minerals. Trace amounts of euhedral grains of apatite and anhedral chlorite are also present.

The intrusion of the diabase was not accompanied by any alteration of the adjacent country rocks, nor by any deformation of the country rock. No mineralization appears to be associated with the diabase dike.

CENOZOIC

Quaternary

PLEISTOCENE AND RECENT

Burwash (1933) has reported on the glacial and lacustrine deposits of the map-area. Unconsolidated glacially derived detritus is not abundant; about two thirds of the area underlain by mafic metavolcanics and one third of the area underlain by the sill and metavolcanic complex is covered by glacial drift.

A large deposit of sand occurs north of the middle of Mongus Lake, and very large drift boulders of diorite, about 20 feet (6 m) high by 10 feet (3 m) by 10 feet (3 m) occur near the middle of Stephen Lake Pluton. The major swamp covered areas are located south of Cedartree Lake, east of Snake Bay on Lake of the Woods, north of Corbett Lake, and surrounding Bog Bay of Cameron Lake.

STRUCTURAL GEOLOGY

Major folding and faulting have affected the rocks of the Cedartree Lake map-area. A northwest-trending fault extending from Stephen Lake through Flint Lake to Dogpaw Lake separates the map-area into two blocks: (1) a northeastern block consisting of anticlinally folded mafic metavolcanics; (2) a southwestern block which forms the major part of the map-area. The southwestern block consists of anticlinally folded mafic metavolcanics and synclinally folded mafic-ultramafic sills and felsic metavolcanics. It has also been intruded by a diorite stock.

Faults

A major fault zone extends from Stephen Lake through Flint Lake to Dogpaw Lake. The fault separates two blocks of different lithology and structure. Movement on the fault has been such that the northeastern block has moved in a northwestern direction relative to the southwestern block. The direction of movement is indicated by the dragged and rotated block of felsic metavolcanics north of Stephen Lake.

The fault is marked by a major zone of shearing which is hundreds of feet wide in most places. Most of the sheared rock is obscured by overburden, but where exposed it is seen to consist of pale brown to dark green strongly sheared, schistose rock. The sheared rock is mainly basalt, but on the southern shore of Dogpaw Lake it is mafic tuff-breccia with highly elongated clasts (Photo 3). The shear zone has been extensively carbonatized and intruded by quartz veins. Occurrences of gold and copper mineralization have been found either in the shear zone or in proximity to it. Some minor faults occur in the area that are related to the major fold structures. These faults will be discussed in the following section on folds.

FOLDS

Three major folds occur in the map-area: the Emm Bay-Peninsula Bay syncline, the Wapus Lake-Bag Lake anticline, and the Caviar Lake-Atom Lake anticline.

Emm Bay-Peninsula Bay Syncline

This fold occurs in the central and southern part of the map-area. The axial plane trends east-northeast and its attitude is approximately vertical. The axis of the fold plunges eighty to ninety degrees towards the east-northeast.

Cedartree Lake Area

The rocks folded into the syncline include the mafic metavolcanics west of Emm Bay, the felsic to intermediate metavolcanics and the mafic to ultramafic sills. Top determinations for the structure have been made from pillowed lavas, from graded bedding in felsic pyroclastics, volcaniclastics, and metasediments, and from mafic to ultramafic sills that have undergone fractional crystallization by gravitational differentiation.

The syncline is an example of both flexural-slip and flexural-flow folding. The mafic metavolcanics and the sills have reacted as competent units with the shear strain being mainly distributed on the unit boundaries such that upon folding, movement took place on the boundaries between these mafic units and the adjacent felsic metavolcanics. This type of folding is termed flexural-slip folding. Most of the felsic metavolcanics have also been folded in a flexural-slip manner. However, the felsic metavolcanics southwest of Little Stephen Lake and south of Stephen Lake have reacted as incompetent units upon folding and have been folded in a flexural-flow manner. Compressive strain from the boundaries of the competent sills have resulted in the formation of many minor flexural-flow folds within the felsic metavolcanics. These folds range in width from a few feet to several hundreds of feet. Because of this flexural-flow folding, the axial plane appears to be folded between Cedartree Lake and Little Stephen Lake.

Sill No. 3 has reacted with brittle rupture to folding in the area northwest of Wicks Lake. It forms a box fold with two limb faults. Slickenside lineations indicate downward movement to the southwest at a 45 degree plunge for the detached part of the sill.

The area of felsic metavolcanics and sills north of Stephen Lake has been rotated about 65 degrees to the south and displaced 1, 500 feet (450 m) to the southeast along a fault striking through Cameron Creek.

Large scale convergent joint fans are associated with the major fold. The joints are especially well developed in the area south of Cedartree Lake and north of Peninsula Bay. They are approximately perpendicular to the bedding and converge on the axial zone of the syncline. East of Emm Bay, minor displacement of Sill No. 2 has taken place along some of these surfaces. This type of joint fan is due to tension and indicates that tangential longitudinal strain was dominant in the formation of the fold (Ramsay 1967). None of the joints appear to have associated mineralization.

Carbonate zones and zones of shearing in the syncline often mark the position of extensive flexural-slip. An extensive carbonate zone occurs at the base of Sill No. 2 in Emm Bay (Photo 11) and about ½ mile (0.8 km) south of the western end of Dogpaw Lake. Gold mineralization has been reported to occur in this zone. A copper mineralized carbonate zone occurs at the southern base of Sill No. 4 and a sulphide mineralized carbonate zone occurs at the top contact of a felsic lapillistone (2e) unit just above Sill No. 4.

Wapus Lake-Bag Lake Anticline

This fold occurs in the northwestern part of the map-area in predominantly mafic metavolcanic lithology. The vertical axial plane trends east-northeast through Bag Lake to Dogpaw Lake where it is truncated by a major fault zone. The axial plane is poorly defined due to the scarcity of undeformed pillow lavas.

Atom Lake Anticline

This fold occurs in the northeastern part of the map-area entirely within mafic metavolcanics. The shape of the fold is indicated by a folded mafic lapillistone unit. The vertical axial plane trends northeast through Atom Lake. It is truncated to the south by the major fault zone south of Derry Lake. Abundant shearing is associated with the fold and lineations on the sheared surfaces suggest that the axis of the fold plunges steeply to the northeast. Though pillow lavas are abundant, they are too highly deformed for use as top indicators.

ECONOMIC GEOLOGY

Gold, copper, zinc, and molybdenum mineralization occurs within the map-area. There are five main structural types of occurrence of mineralization:

1) Dogpaw Lake fault zone occurrences — Gold occurs with pyrite in carbonatized shear zones around Dogpaw Lake, Flint Lake, and Stephen Lake. The shear zones are extensively intruded by quartz veins. Copper occurs in chalcopyrite within a shear zone southeast of Derry Lake.

2) Flexural-slip zone occurrences — Gold occurs within carbonatized zones at the bases of some competent units that have been folded into the major syncline within the map-area, e.g. north of Emm Bay and south of Dogpaw Lake. Copper occurs within chalcopyrite in a carbonatized zone below the gabbro Sill No. 4 south of Little Stephen Lake.

3) Fold fracture occurrences — Gold occurs associated with carbonatized zones along fold related joints within the gabbro of Sill No. 2 west of Wicks Lake.

4) Porphyry dike and quartz vein occurrences — Gold occurs associated with quartz veins spatially associated with carbonatized zones and porphyry dikes, e.g. southwest of Wapus Lake and the Flint Lake Mine deposit northeast of Flint Lake.

5) Diorite intrusion occurrences — Gold and molybdenum are associated with shear zones in the Stephen Lake Pluton.

6) Syngenetic dacitic tuff occurrences — Zinc and copper occur in sphalerite and chalcopyrite associated with well-bedded dacitic tuff on the northwestern shore of Weisner Lake, and sulphide mineralization occurs associated with dacitic tuff south of Stephen Lake.

Copper and Copper-Zinc Mineralization

Chalcopyrite occurs within sheared mafic metavolcanics along the major fault zone north of Stephen Lake and within a flexural-slip zone in carbonatized dacitic tuff at the base of a gabbro sill south of Little Stephen Lake.

Disseminated chalcopyrite and sphalerite usually accompanied by pyrite and pyrrhotite occur within and along the bedding in dacitic tuff. The mineralization is typically conformable to the bedding, although some thin irregular massive sulphide veins do occur, possibly developed by remobilization of the primary conformable mineralization.

Cedartree Lake Area

Most of the recent exploration work has been concerned with copper-zinc occurrences within dacitic tuff. Geophysical exploration has consisted of magnetic and electromagnetic surveys followed up by diamond drilling.

Gold and Molybdenum Mineralization

Most of the exploration in the map-area has been concerned with the search for gold, with a few short lived producing mines resulting, e.g. the Gold Panner Mine, the Gold Sun Mine and Flint Lake Mine. The gold has always occurred with carbonatized shear zones or associated with quartz veins or porphyry dikes. Shear zones associated with the major fault zone extending through Dogpaw Lake to Stephen Lake seem especially favourable for the occurrence of gold mineralization. In the area south of Dogpaw Lake, shear zones associated with flexural-slip are also favourable for gold mineralization.

Only two minor occurrences of molybdenum are known in the map-area. One occurrence is associated with a quartz vein on the western side of Wapus Lake (Frobisher Prospect) and the other is associated with quartz veins within the Stephen Lake Pluton near its contact with dacitic tuff south of Little Stephen Lake. The quartz veins are reported to contain chalcopyrite and molybdenite (Kenty occurrence, R. Thomson 1945a).

Description of Properties

AMAX PROSPECT (1)

Amax Exploration, Incorporated investigated three properties within the map-area in 1970. They were the following: the Cedartree Group, the Stephen Group and the Peninsula Group.

Cedartree Group

The Cedarttree Group consists of nine unpatented claims, K-245137 to K-245145, and is located south and southwest of Little Stephen Lake. Magnetic and electromagnetic surveys were conducted on the property in 1970 (R. Bradshaw 1970a).

The surface geology consists of dacitic tuff, ignimbrite and a gabbro sill all enclosed within the hinge zone of a major syncline. The western edge of the Stephen Lake Pluton has intruded this sequence in the eastern part of the claim group. A carbonatized and altered zone of sulphide mineralization occurs in the dacitic tuff at the base of the gabbro sill. This zone occurs in the southern part of the claim group and is continuous for at least 4,000 feet (1,200 m).

The geophysical surveys have located two conducting anomalies. The first EM conductor is east-west-trending and occurs in the centre of the claim group within the dacitic tuff. The anomaly is about 3,000 feet (900 m) long and coincides with a linear low swampy area which has a rusty carbonated outcrop exposure at its eastern end. The

second anomaly is about 2,600 feet (800 m) long and is in the southern part of the claim group. It is coincident with the mineralized carbonatized zone below the gabbro sill.

Stephen Group

The Stephen Group consists of six unpatented claims, K-245183 to K-245188, and is located on the northwestern side of Stephen Lake (over part of the Kenty occurrence). Magnetic and electromagnetic surveys were conducted over the property in 1970 (R. Bradshaw 1970b).

The surface geology consists of a northeasterly trending sequence of dacitic tuff, flows and an ignimbrite intruded by the northern part of the Stephen Lake Pluton. The magnetic and electromagnetic surveys delineated a prominent anomaly that was probably caused by sulphide and magnetic mineralization. The anomaly is northeast-trending and occurs along a gossan zone on the eastern side of an ignimbrite unit in the centre of the claim group. The mineralized body is indicated to be more than 1,200 feet (360 m) long with a dip of 60 degrees to the east. The report recommended further prospecting and some diamond drilling to evaluate the anomaly.

Peninsula Group

The Peninsula Group consists of four claims, K-299405 to K-299408, located north of Peninsula Bay of Kakagi Lake. Magnetic and electromagnetic surveys have been completed on the property by Shield Geophysics Limited (R. Bradshaw 1970c).

The surface geology consists of a sequence of intermediate to felsic breccia-tuff with an east-west strike and dip varying from vertical to steeply north. No anomalies of any significance were reported.

BUCKLES, NORTH, WALSTEN OCCURRENCE (2)

The property consisted of 21 unpatented claims: K10018 to K10023, K10040 to K10051 and K10061 to K10063. It was located northwest of Cedartree Lake. The property was optioned by Sylvanite Gold Mines Limited in 1944 from K. North, C. Walsten and H. Buckles.

The surface geology consists of mafic-ultramafic Sill No. 1 underlain to the west by mafic metavolcanics. Quartz porphyry dikes intrude the mafic metavolcanics. In a letter to W.V. Moot, November 6, 1944, G.L. Holbrooke (both of Sylvanite Gold Mines Limited) mentioned a northeast-southwest-trending mineralized shear zone near the centre of claim 10061. The zone is reported to be about 60 feet (18 m) wide with low gold values across the width with several samples running as high as 0.23 ounces gold per ton.

CANADIAN ARROW MINES LIMITED* (3)

Canadian Arrow Mines Limited hold a group of 13 claims at the southern end of Dogpaw Lake which formerly belonged to Noranda Mines Limited. Prospecting, trenching and 18,373 feet (5,600 m) of diamond drilling in 116 holes have been performed on the property.

The surface geology consists of intensely sheared mafic and intermediate metavolcanics and quartz porphyry and quartz-feldspar porphyry dikes. Gold mineralization is associated with the shear zones and the porphyry dikes which both trend in an east-west direction. The southern part of the claim group is mostly occupied by a gabbro sill (Sill No. 1).

A deposit of 99,650 tons grading 0.43 ounces of gold per ton had been outlined (Northern Mines, May 4, 1961). Three veins averaging 5.3 feet (1.6 m) in width have been investigated to a maximum depth of 600 feet (180 m). The gold occurs in or near the veins (actually silicified zones) and is always associated with pyrite mineralization (Davies 1961). The property has been inactive since 1962.

CASWELL-WILLIAMS PROSPECT (4)

The property lies on the southern side of Flint Lake and on the northern side of Cedartree Lake, and consisted of the following nine claims: K9929 to K9930; K9959 to K9961; and K9986 to K9989.

The deposit was discovered by A. Gauthier while he was prospecting for J. Errington. Preliminary trenching and diamond drilling were carried out, but the claims were allowed to lapse by Mr. Errington. They were subsequently staked by N. Caswell and P. Williams and optioned to Noranda Mines Limited in 1945. In the summer and fall of 1945, Noranda performed 494 feet (150 m) of x-ray diamond drilling and 6,108 feet (1,861 m) of E core drilling of the property. A length of 3,000 feet (900 m) along the major shear zone on the south shore of Flint Lake was tested in this manner (Bell 1946).

The surface geology of the western part of the claim group consists of intermediate tuff, lapillistone and tuff-breccia. In the northeastern part of the claim group the surface geology consists of an intensely sheared felsic rock which has been converted to a sericite-feldspar schist. The original nature of the rock is interpreted to be a felsic tuff that varies from coarse massive beds to finely bedded material. The shearing trends N75E and dips 85 degrees to the south.

The gold mineralization is present in the zones of sericite schist and is associated with lenses of pyrite mineralization and in places lenses of silicification. Bell reports that the gold values due to pyrite mineralization are generally low, but that there is some free gold (usually quite fine) plated along the schist planes.

Bell reported a short lens of gold mineralization to exist from 100W to 100E on the property. Some of the intersection gold values are given in the following table:

*Name changed in March, 1970 from Consolidated Golden Arrow Mines Limited to Canadian Arrow Mines Limited.

Diamond Drill Hole	*Assay Interval (feet)*	*Gold (oz./ton)*
6	4.0	0.37 (coarse V.G.)
5	5.0	0.14
XI	11.0	0.22
X2	7.6	0.11
HI	6.5	0.16
HI	8.0	0.11

Between section 1050 W to 1500 W on the property, several holes showed commercial values of gold, but were difficult to correlate. Their best values (Bell 1946) are given in the following table:

Diamond Drill Hole	*Assay Interval (feet)*	*Gold (oz./ton)*
12	8.0	0.18
26	4.5	0.18
14	8.0	0.23
18	5.0	1.40 (coarse V.G.)

R. Thomson also reported on the property (1945d) and wrote the following concerning the gold bearing intersections:

> In 1936 four diamond drill holes were put down from the ice of Flint Lake. In 1945 some 25 holes up to November 1, were drilled from land at intervals of 50 or 100 ft. along the strike of the deposit. The holes were drilled at –45 degrees, in general and were for the most part less than 200 ft. in length. In some of the drill holes two gold bearing zones were intersected; the gold bearing sections were from one to nine feet wide and consisted of soft whitish altered schist, in part quite talcose, with minor silicified areas. Pyrite occurs in irregular veinlets, areas and disseminated cubes in varied amounts up to an estimated four percent, and in size from very fine grained up to about 1/10 inch. Visible gold in very fine flakes was seen along some of the talcose shear planes.

CATES OCCURRENCE (5)

The Cates claim group surrounds Derry Lake north of Stephen Lake. The property was optioned by Noranda Mines Limited in 1960. A geological map of the area at a scale of 1 inch to 200 feet (1:2,400) was produced by Noranda Mines Limited. The surface geology consists of highly sheared mafic metavolcanics with gabbro and dacitic tuff in the southern part of the claim group. Southeast of Derry Lake, trenching across sheared mafic metavolcanic rocks revealed minor chalcopyrite in this cross fractures, but geophysical surveys along strike of the shearing failed to establish continuity of the mineralization (G. Cates, personal communication to J.C. Davies).

Cedartree Lake Area

H.K. CRAIBBE (WRIGHT OCCURRENCE) (6)

H.K. Craibbe held this property during the field season. The property is in the extreme southwest of the map-area, on Young Bay of Kakagi Lake.

The following is from Fraser (1943):

> A group of nine claims on Young's Bay, Kakagi Lake, staked by M.P. Wright and others, are underlain mainly by pillow lavas and amphibolite. Dikes of diorite and feldspar porphyry are very numerous. A number of quartz veins carrying gold in visible quantities have been discovered. Of these, one referred to as No. 4 vein, on claim K. 3,090 [K 3,909], is exposed for the greatest length. The vein consists of several lenses of quartz in a length of 275 feet. The quartz is up to 30 inches in width. Gold was seen at several points in it. Little surface work has been done on the property, and no assays are available.

P.J. DUBENSKI (GOLD PANNER MINE)* (7)

The property lies on an island in the southern part of Caviar Lake in the northeastern part of the map-area. The surface geology consists of quartz porphyry dikes intrusive into highly sheared basalt. Gold mineralization is reported to occur associated with quartz veins which are present in an 8 foot (2.4 m) wide carbonatized shear zone within a quartz porphyry dike.

The property was worked for a short while around 1899, but generally low gold values and operating difficulties due to water led to a stoppage of work on the property in 1903.

FLINT LAKE PROSPECT (8)

The Flint Lake Gold Mine Company acquired a property on the northeastern side of Flint Lake in 1901. Mineralization on the property consists of gold bearing quartz veins intrusive into carbonatized basalt. Pyrite and chalcopyrite were also reported associated with the gold. Two vertical shafts and some trenches were blasted on the property, but the assayed gold values were generally low. The property was never brought into production. The property is adequately described by E.M. Burwash (1933, p.82-84).

FROBISHER PROSPECT (9)

The Frobisher Exploration Company Limited property was located east and southwest of Wapus Lake. R. Thomson (1944a) reported the following on the property:

> The initial discovery was made by R.M. Burris in 1942 on Indian Reserve 33A southeast of Wapus Lake. Frobisher Exploration Company Limited secured a

*The property is described in the geological report by E.M. Burwash, 1933, 80-82p.

lease on approximately 960 acres in the southeast corner of the reserve and began exploration work early in 1944. Three additional claims, K-10247, 8 and 9 south of the reserve were acquired by Frobisher south of and tying on to the reserve along its southeast corner. Thirty one claims, Nos. K10216-10246 were staked east of the reserve, extending from Wapus Lake to Dogpaw Lake.

In addition to the trenching and diamond drilling done on the showings on the leased portion of the Indian Reserve adjacent to the showings, the rest of the portion of the reserve and also the two groups of claims were carefully prospected. On the leased portion of the reserve and the southern group of three claims, east-west lines were cut at 400 foot intervals. On the eastern group of claims a base line of S32°E was run and lines run off at right angles to this at 440 foot intervals. The ground was prospected carefully.

The surface geology consists of mafic metavolcanics intruded by irregular trending quartz and quartz-feldspar porphyry dikes. The metavolcanics are mostly metabasalt, except for the mafic to intermediate tuff-breccia on the western side of Dogpaw Lake. Most of the rocks in the area are massive and not highly sheared. However, the rocks on the western side of Dogpaw Lake are intensely sheared and carbonatized. Mineralization in the area consists of gold and molybdenite in quartz veins associated with the porphyry dikes.

The economic geology of the property was very adequately reported on by R. Thomson (1944a) from whose report the following discussion on economic geology is extracted.

Gold is the only mineral occurring in amounts of possible economic importance. The main showing, 'Vein No. 1' was trenched and diamond drilled; the less promising showings 'Vein No. 2, Vein No. 3 and the molybdenite vein' were trenched. Frobisher Exploration Company Limited did not find these showings to be of sufficient interest to merit a continuance of the work.

Molybdenite occurs in some of the quartz veins, notably the "molybdenite vein" and also in veinlets on the peninsula in Wapus Lake. However, nowhere were the amounts sufficient to be of commercial interest.

The association of quartz veins with acidic dikes is noteworthy. The shearing along which the quartz veins and the alteration occurs follows the sides of the dikes although not with uniformity. The shearing appears to have taken place not later than the formation of the dikes and the association of the gold deposits to them appears to be a physical one only.

High gold values were obtained almost exclusively from quartz veins.

Vein No. 1

The initial discovery was made on a moderately sized hill. Along its strike, a few degrees west of south, swamp is encountered after about 400 ft. At about 1,100 feet a few degrees east of north is another swamp. Between the two swamps overburden is in general very slight. Quartz float is rather widespread along the strike giving the impression of a larger deposit that was disclosed by subsequent work.

This showing is about 3,300 feet west and some 2,800 feet north of the southeastern corner of I.R. 33A [Figure 2, Chart A, back pocket]. Quartz veins, commonly with schisted altered carbonated wall rock, follow a porphyry dike, but not in a uniform fashion. In places the vein leaves the edge of the dike and cuts through altered lava. The strike of the zone is approximately N8E and the dip to the west of moderate angles. Quartz lenses occur along a zone over 1,300 feet long. The lenses are usually less than one foot wide but show sharp bends, rolls and transitions into a system of veinlets.

The quartz in the veins, for the greater part, is coarse and vitreous. Pyrite and chalcopyrite occur as traces only. Magnetite is reported to be given in panning crushed samples.

. . . gold values are confined exclusively to the quartz veins, neither the somewhat carbonated schist or silicification giving returns of much interest. In places visible gold in rather fine particles occurs plentifully and appears to lie

in the midst of unfractured massive quartz. The quartz veins are exposed on surface over a length of about 250 feet.

Diamond Drilling

Some 48 D.D. holes were drilled and showed that the quartz veins were narrow often as little as 0.2 feet and discontinuous over a length of about 1,000 feet. Assay returns are reported to be disappointingly low and erratic.

Method of Exploration

An area along strike of vein some 1,750 feet long and from 10 to 200 feet wide had been cleared of trees. The deposit was explored by shallow trenching to expose bed rock, particularly to ascertain the geological relations but not for systematic sampling. The real test of the deposit was a series of 48 D.D. holes for the most part at 20 feet intervals laid out to intersect the vein at depths 20 feet below the surface. This was supplemented by one D.D.H. to intersect the vein at 100 feet and six holes to test the southerly extension. Diamond drill cores were of "A" size 1⅛ inch diameter for the most part.

Subsidiary Structures

Three D.D. holes showed a carbonatized zone to extend S30W about 800 ft. from near the south end of vein No. 1. It contained no quartz and gave no gold values in assay. Another carbonatized zone occurred near the southern end but again no values were obtained, these trend S49E and S16E.

Porphyry Dikes

The sheared zone with the quartz veins seems to follow along porphyry dikes. Possibly these dikes have some structural significance in localizing the shear but it is not a simple one, as the shear passes through the dike. Note any differences between fractures in porphyry and in greenstone.

Vein No. 2

Vein No. 2 was discovered northwest of vein No. 1. It is about 5,000 ft. north and 750 ft. east of the southwestern corner of the leased part of the reserve. The surface has been stripped for about 200 ft. in a direction on about N67E. The stripping shows quartz porphyry intersected by a shear which seems to run more like N37E. About 7 ft. from the western side of the stripping, quartz stringers make up an estimated 30 to 50 percent of the rock over a width of about 2 ft. Some irregular quartz veinlets occur in other parts of the stripping. Farther north along the stripping the shears and fractures with minor quartz veinlets traverse greenstone and then go into porphyry again. In the porphyry is a 2-3 ft. wide trap dike also cut by shearing.

Apparently minor and scattered amounts of gold were found but nothing of commercial interest.

Vein No. 3

This vein lies about 3,600 ft. north and 850 ft. east of the southwestern corner of the leased part of I.R. 33A. Some quartz veins in a faint shear strike about N40E and dip 75 degrees NW by intersecting a quartz feldspar dike 35 ft. wide. Some stripping and shallow trenching has been done along a length of about 250 ft. along a slight hill which goes into swamp at both ends. Coarse vitreous quartz is in veinlets in one place up to 9 inches wide but usually is less than 1 inch stringers making up half of about 1½ foot widths. Visible gold was seen in a stripped place near the southern end and also a black unidentified metallic. Pyrite was noted in traces only.

Molybdenite Vein

The southwestern end of (so far as traced) this vein lies about 4,800 ft. north and 1,350 ft. east of the southeastern corner of the leased part of Indian Reserve 33A. It has been traced some 1,500 ft. in a N42E direction, the northern end intersecting a granite outcrop just south of the depression across the neck of the large peninsula in the south central part of Wapus Lake. Chalcopyrite, pyrite and pyrrhotite with some magnetite (reported) were found. Rare 1/20 inch streaks of fine-grained molybdenite occur in it. Farther south the vein cuts through massive lava on the south side of the swamp. South of the granite outcrop it was about 2 ft. wide.

Gold is reported but in such minor amounts as to be of no commercial importance.

GATEWAY OCCURRENCE (10)

Gateway Uranium Mines Limited drilled 8 diamond holes in 1961 in three areas around Flint Lake. The holes totalled 1,178 feet (359 m) in length. The areas drilled were the neck of land between Dogpaw Lake and Flint Lake, the area on the southwestern side of Flint Lake south of the entrance bay to the Cedartree River and the western end of the peninsula on the eastern side of Flint Lake. No mineralization of economic importance was reported.

GAUTHIER OCCURRENCE (11)

The A. Gauthier group is located on the northeastern side of Dogpaw Lake. The group consists of 12 claims: K10765, K10933 to K10937, K11109 to K11113, staked in 1944 and 1945 (Figure 3).

The southern part of the claim group (K10765, K10933 to K10938) was optioned to Sylvanite Gold Mines Limited in 1944. After some sampling had been done on the property, Sylvanite relinquished their option in the spring of 1945.

The surface geology consists of metabasalt with an interbedded 300 foot (90 m) thick unit of intermediate lapallistone and tuff-breccia. The rocks in the western part of the claim group are intensely sheared and carbonatized in places and are part of the major shear zone that extends through Dogpaw Lake. A north-northwest-trending diabase dike also occurs in the area. The mineralization consists of gold bearing quartz veins associated with shear zones in the metavolcanics.

R. Thomson (1945b) has reported on the property and the following discussion of the economic geology is from his report:

> The main showing on claim K11109 consists of discontinuous quartz veins along a well marked shear which seemed to lie approximately along the contact of basic lavas (to the south) and acidic lavas. The strike is roughly south 50 degrees east and the dip steeply to the north. Some details of the showing are shown on accompanying sketch assay plan [Figure 3]. Quartz, in widths up to 3 feet, is mineralized with small amounts of pyrite and the enclosing light coloured schist also contains some pyrite.
>
> Grab samples of quartz have contained gold up to 0.26 ounce per ton but rough sampling done for Noranda Mines [Figure 3] showed the average gold content to be very much lower and only minor amounts to be present in the schist.
>
> Northeasterly of the main showing along the picket line some quartz veins, with strikes at high angles to the direction of the large shear are exposed in minor strippings [Figure 3]. Minor pyrite is contained in the quartz.
>
> At some 220 feet northeasterly of the 100 foot stake on the picket line and on the northeast face of a hill, quartz over a width of 3 or 4 feet is exposed. Mr. Gauthier reports that panning of this quartz gave a tail of an unknown white mineral. This was verified by the present writer and a sample is being sent for determination.
>
> In a hurried walk over some trenches, on claim K-10765 that had been sampled by Sylvanite Gold Mines Limited during the winter of 1944-5, the writer notes some narrow quartz veins, mineralized with pyrite and some chalcopyrite. The general strike of the veins is northerly but the strike of the minor schisting seen is a little south of east. The quartz veins seem to be of the nature of cross or tension fractures. In one place assay returns by Sylvanite Gold Mines of 7 dwts. gold per ton over widths of a foot or less are reported.

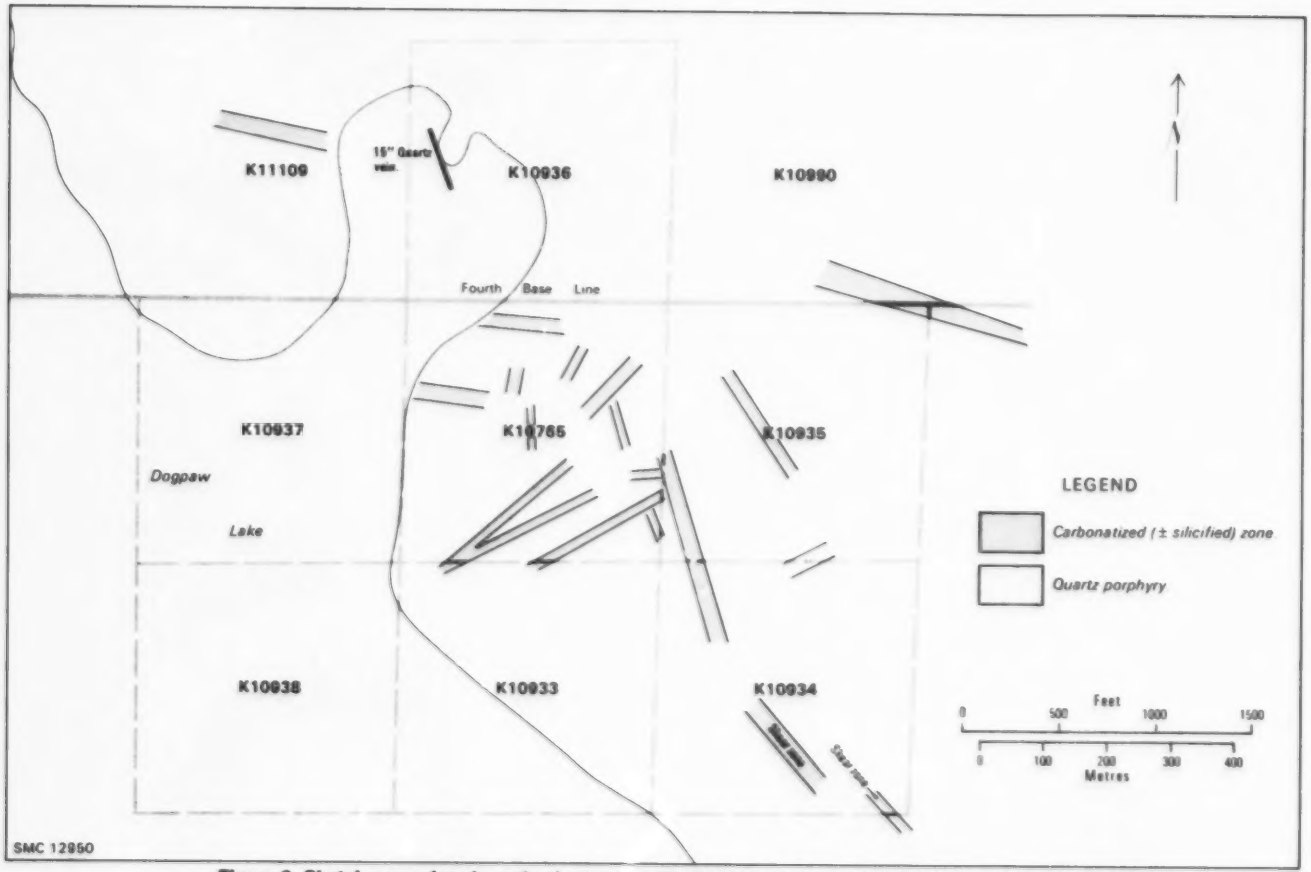


Figure 3–Sketch map of carbonatized zones on Gauthier Occurrence (modified after A. Gauthier 1946).

> In this group of claims the occurrence of gold along the somewhat easterly westerly trending (possible arcuate) shear zones with other gold bearing veins in fractures with minor structural disturbance striking nearly at right angles to them seems to follow a somewhat common pattern of the Dogpaw area.

Subsequent work on the property by A. Gauthier involved shallow trenching and three shallow diamond drill holes 60 feet (18 m) apart. G.L. Holbrook (1945a) reported to Sylvanite Gold Mines Limited about the property and remarked that:

> Gauthier has made a new find on claim 11109 which gives very interesting results from surface sampling and which has given similar results from three shallow diamond drill holes 60 feet apart. The values in the Gauthier find occur in quartz veins in a 30 feet to 40 feet wide carbonate zone striking S76E with a 70 to 80 degree north dip. The vein in which his best values occur is parallel to the carbonate zone in which it lies and has a width from 2.5 feet to 4 feet for the 150 feet length uncovered. Mineralization is sparse and consists mostly of pyrite with a little chalcopyrite and considerable very fine visible gold.

Assays obtained on the main showing of the Gauthier Occurrence are presented below (Gauthier 1946):

Type Sample	*Intersecting Interval*	*Gold oz./ton*
Diamond drill core	Hole No. 1 6 feet	0.70
drill core	Hole No. 2 5.5 feet	0.65
drill core	Hole No. 3 5 feet	0.85
Channel samples		0.27
Channel samples		0.25
Channel samples		0.09
Channel samples		0.77

Assays of various grab samples have ranged up to 2.40 ounces gold per ton. (A. Gauthier, May 28, 1946 in a letter to G.G. Ennis).

Sylvanite Gold Mines Limited found an extension of Gauthier's main showing zone and traced the eastern extension of the carbonate zone for a length of 2,500 feet (760 m) across their property. Five trenches were blasted along the zone in a length of about 1,200 feet (360 m). However, assays of channel samples of the trenches revealed negligible amounts of gold (Holbrooke 1945a).

GOLDRAY-CANADIAN MALARCTIC PROSPECT (12)

The property is located at the northwestern corner of Weisner Lake and consists of the following 10 claims: K-242348-242357. Most of the property had formerly been claimed by Noranda and had then consisted of 12 claims: K32041-44, 32064-67, 32110-13. Six diamond drill holes were drilled in 1962 by Noranda Mines Limited. These holes

were situated at the northwestern edge of Weisner Lake, four of them being on ice. The diamond drill holes totalled 1,594 feet (385 m) in length and encountered mineralization consisting of minor disseminated pyrite and pyrrhotite with minor sphalerite and chalcopyrite.

In 1970, 1,482 feet (430 m) of diamond drilling in 4 diamond drill holes was reported performed on the property by Goldray Mines Limited and Canadian Malarctic Gold Mines Limited. The surface geology consists of part of a mafic-ultramafic sill which is overlain by a well bedded dacitic tuff. The sequence has been intruded to the north and east by the Stephen Lake Pluton. Zinc and copper mineralization has been found to occur in the dacitic tuff. It appears that the mineralization occurs in a zone varying from 10 feet (3 m) to 20 feet (6 m) in thickness that is conformable to the bedding of the enclosing pyroclastics and that has been traced for at least 600 feet (180 m). Within this zone, the mineralization varies from sulphides disseminated within and along the bedding to lenses of massive sulphides. The sulphide minerals present are pyrite, pyrrhotite, chalcopyrite, and sphalerite.

The nature of the mineralization is very similar to that exposed in an outcrop of dacitic tuff along the shoreline of a partly drained lake about 8,000 feet (2,400 m) northwest of the above showing.

GOLD SUN PROSPECT (13)

The area occurs south of Jessie Lake and on the northern and western sides of Emm Bay. The Gold Sun Mine existed in the late 1800s in the area and according to J.A. Bow (1900):

> Other properties have been and are in operation in this vicinity, but they were not visited. I got some information from Mr. A.A. Atwater, manager of a property consisting of locations JC81 and 97, and FM 145, situated northwest of Crow Lake, and owned by the Gold Sun Mining Company Limited; head office, Windsor, Ontario. Six miners were employed all summer. Two tunnels, 45 and 70 foot long respectively and 600 feet apart had been driven to cut the same vein, besides stripping and blasting along the surface.

J.P. Williams and N.S. Caswell claimed the area covering the Gold Sun prospect. Sylvanite Gold Mines Limited optioned the following claims from Williams and Caswell in 1944: K10114 to K10122, K10182 to K10211. In a letter dated February 21, 1944, the showing of interest is described as a highly carbonatized zone carrying many quartz stringers and veinlets. The zone varied in width from 200 feet (60 m) to 400 feet (120 m) and had been traced for well over two miles (3.2 km) along strike (Letter from G.L. Holbrook to W.V. Moot, Vice President and Managing Director, Sylvanite Gold Mines Ltd.). The carbonatized zone is probably related to flexural slippage during the formation of the major folds in the area.

In the spring of 1944 (R. Thomson 1944b), Sylvanite collared some diamond drill holes "...near the tip of the peninsula extending northeasterly into Kakagi Lake on claims K10211 and K10210. A carbonatized zone some 25 feet wide and with strike about 90 degrees (magnetic) was drilled through from both sides." The claims were abandoned in early 1946.

INTERNATIONAL NICKEL OCCURRENCE (14)

The International Nickel Company of Canada Limited held a group of four claims about ½ mile (800 m) south of Weisner Lake: K43410, 43411, 43424, and 43425. In 1969, they reported on one diamond drill hole in the southwestern corner of claim 43425. The surface geology consists of vertically dipping, north-south trending, bedded dacitic tuff above and below a gabbro segment of Sill No. 4. The diamond drill hole was 169 feet (52 m) long and it encountered mainly dacitic tuff.

JENSON-JOHNSTON OCCURRENCE (15)

The Bag Lake Group consists of 11 claims in an area northwest of Bag Lake, K32133 to K32143. The area was staked in 1960 by W.A. Johnston and Associates of Kenora and optioned by Selco Exploration Company in 1961.

The surface geology consists of metabasalt intruded by quartz porphyry dikes. The metabasalt is commonly pillowed and is usually massive. B.M. Arnott (1961) reported on the geology and economic mineralization of the area for Selco Exploration Company Limited. Within the area of metabasalt, Arnott was able to distinguish three mafic intrusive dikes trending northeast and roughly parallel. He reported definite intrusive chilled relationships between the mafic intrusives, the composition of which ranges from diorite to gabbro, and the metabasalt. Arnott also distinguished between two generations of quartz porphyry, and in the following excerpt from his report he discusses the relationships between the two rocks.

> Quartz porphyry is a common rock in the map area. The gold discovered by Johnston and his partners was in a highly altered, fractured and mineralized quartz porphyry and subsequently numerous other similar finds were made in the vicinity. However, most of the quartz porphyry outcrops are massive and unaltered.
>
> It was originally thought that the mineralized and unmineralized porphyries were the same rock and different only in the extent to which they had been fractured. However, at 2460 S., 150 W. the two rocks are exposed in contact. The contact is sharp, showing some minor cross faults, and inclusions of the old schistose porphyry can be observed in the fresh and massive variety. There are clearly two ages of quartz porphyry.

The locality Arnott refers to is situated about 2,800 feet (850 m) S35E from the point where the Bag Creek intersects Highway 71.

For a discussion of the economic geology of the group, the following extracts from Arnott's reports are quoted (Arnott 1961 a and b).

> The known gold occurrences all lie within a comparatively small area on claim K32140. Numerous dikes of the older quartz porphyry occur within the diorite and close to it, and their frequency increases with proximity to the creek fault. A few showings have been discovered in greenstone to the south and the east of the diorite, but the focal point of the mineralization appears to be where the creek fault cuts the diorite.
>
> There dikes occupy two separate and distinct sets of fractures. The first parallel the creek fault, striking about N15W, and there is a second, complementary set which strikes roughly S30W, at a low angle to the walls of the diorite.

These older quartz porphyry dikes carry a considerable amount of pyrite mineralization. Quartz is associated with them as a stockwork of small irregular veinlets filling tension cracks, and in places they carry gold values of economic importance.

Surface Stripping

The showings were thoroughly exposed by use of a high pressure pump together with a limited amount of hand labour and bulldozing.

When exposed, the showings were found to be a set of weak shear zones. The main set of parellel fractures strike north-south and there are subsidiary branching structures trending northwest.

These zones are so highly carbonatized and silicified that the original character of the rock is almost entirely obscured, and some of the oxidized surface samples were mistakenly identified as porphyry. The drill cores from below the oxidized surface show that most of the mineralized zones are the result of intense alteration and replacement along fractures in the diorite. Stripping and diamond drilling showed one of the northwest fractures filled with carbonatized and mineralized acid dike of felsitic appearance. Probably both replacement and dike intrusion vary in local importance in the same set of fractures. It will be noted on the plan and sections that these carbonatized shears occur as a series of overlapping lenses. Within the shear zone are local pods, a few feet in extent, of mineralized and quartz filled fractures, distributed in varying amounts throughout the carbonatized shears, but appears to have no relationship to assays.

Diamond Drilling

Seven holes were drilled, numbered 1-8 (No. 7 not drilled), with a total footage of 1,647 feet. These holes were spaced at 50 feet intervals over a strike length of 250 feet. A few low values were cut and the structure can be seen as a weak system of overlapping lenses.

Before the drilling was started it was hoped that the ravine occupied by the creek represented a fault zone, and that the exposed mineral showings were in subsidiary fractures. The drilling showed no fault and therefore there is no main structure to give strength and continuity to the fracture zones.

General Prospecting

A large number of other mineralized outcrops were found, both on the main group of claims and the adjoining group to the north which is also under option. The assays were negligible from all except two locations, and it was found that the gold values in these two locations were associated with minor local conditions and are of no importance.

Conclusions

The gold values are associated with small pods of quartz filled and pyritized fractures within lenticular carbonatized shears in diorite. There is lack of continuity of both values and structure.

KENTY OCCURRENCE (16)

On discovering some gold occurrences in 1945, J. Kenty staked a group of 20 claims north and south of Little Stephen Lake. The claims consisted of the following: K11195 to K11212, K11251, and K11252. R. Thomson, the Resident Geologist of Kenora, reported on the property in the fall of 1945 (Thomson 1945a).

The surface geology consists of felsic metavolcanics and a dioritic stock. The felsic metavolcanics are mainly dacite flows with interbedded tuff units. The part of the Stephen Lake Pluton covered by the claim group ranges in composition from a quartz diorite to an augite diorite.

The main occurrence of gold mineralization is with sulphide minerals in a shear zone

that has been traced over a distance of 1,350 feet (400 m). The shear zone trends N80W and occurs in felsic tuff. It is situated near the northern borders of claims K11202 and K11209, and ends near the middle of the northern border of claim K11209. The gold is associated with the sulphide mineralization which consists of pyrite (2 to 4 percent), small amounts of pyrrhotite and chalcopyrite, and rare sphalerite. Work done on the property included one rock trench and five short diamond drill holes.

Additional gold occurrences were reported on the property. They include the following:

— in the northeastern part of K1198, a 15 foot (4.5 m) wide zone of fracturing in granodiorite yielded gold tailings on panning; the zone also contained minor pyrite and was altered.

— in claim K11195, a few hundred feet from Stephen Lake and in the southern part of the claim, rusty showings in granodiorite yielded gold taillings on panning.

— in the eastern part of claim K11209, gold occurrences have also been reported.

— in the part of the group lying south of Little Stephen Lake, J. Kenty reported that gold was found in small quartz veins which also contained chalcopyrite and molybdenite.

LOGIE OCCURRENCE (17)

The property lies ½ mile (800 m) east of the former Gold Panner Mine on Caviar Lake. Minor sulphide mineralization is associated with quartz veins in carbonatized shear zones. The property consisted of claims K7523 to K7526, K7528 to K7530 and FM161 to FM163.

The property was examined by J.A. McClasky for Sylvanite Gold Mines Limited, but was not optioned. In a letter to G.L. Holbrook by J.A. McClasky (April 23, 1944, both of Sylvanite Gold Mines Limited), McClasky mentioned that Mr. Logie told him that he (Logie) assayed some samples which ran as high as 0.77 ounces gold per ton, but that his average was around 0.20 to 0.23 ounces of gold per ton. McClasky mentioned that Mr. Logie "had totally lost all of his papers with assay results mentioned heretofore."

MARTIN-KENTY OCCURRENCE (18)

The claim group occurs at the southern end of Dogpaw Lake and adjoints the McLennan-Martin claim group to the south. The claim group consisted of 22 unsurveyed claims as follows: K9990 to K10005, K10010 to K10011, K10033 and K10057 to K10059.

R. Thomson, Resident Geologist at Kenora reported on the property in 1947 (Thomson 1947b). The following discussion of the history of the claim group is from his report.

> Towards the close of the last century the vicinity of Dogpaw Lake and Kakagi Lake was prospected and although some discoveries were made no productive gold mines were brought in. It is reported that Martin Dolby discovered the gold occurrence at what is now Vein No. 1 on the Martin-Kenty Group. In the mineral exhibit of the Ontario Department of Mines at the Pan-American Exposition, Buffalo, New York, U.S.A., in 1901, a speciman labelled "quartz

showing free gold" from the Otonabee Mine camp came from Vein No. 1 probably certainly from claim K9992. After this early work the claims lapsed and the knowledge was lost that a gold occurrence was situated there. Mr. Stan Gifford and Mr. Dave Raney rediscovered the occurrence but did not stake it. The discovery by R.M. Burriss in 1942 of a gold occurrence southeast of Wapus Lake in Indian Reserve 33A caused renewed interest to be taken in the area. In the fall of 1943 Jack Kenty and Roy Martin, prospecting for Noranda Mines Limited rediscovered the showing, now part of Vein No. 1, in claim K9992. The group of 22 claims were staked. In 1944 the group was prospected with the result that several other gold showings were found; minor trenching and some 9,300 feet of diamond drilling was done. In 1945 and 1946 no further work was done.

The surface geology of the claim group consists of a 3,200 foot (975 m) thick gabbro sill underlain to the west by mafic metavolcanics, mostly metabasalt, and overlain to the east by intermediate tuff, lapillistone, and tuff-breccia. Quartz-feldspar porphyry dikes occur in the above rocks and they sometimes carry associated gold mineralization. A shear zone trending north-northwest extends through the middle of the claim group. A total displacement of about 600 feet (180 m) has taken place along the shear zone. Gold has also been reported in shear zones in the gabbro.

The economic mineralization consists of gold associated with pyrite and quartz veins in altered shear zones in the gabbro. The following discussion of the gold mineralization of the claim group is from Thomson (1947b):

Economic Geology

Gold is the only mineral known to occur in economically important amount. Amphibole asbestos is also found.

The work done on the gold occurrences . . . consisted of minor trenching and some 9,300 feet of diamond drilling. Noranda Mines report that No. 1 Shoot is of good grade and has dimensions of approximately 200 feet by 8 feet; it was tested to a depth of 350 feet. No. 2 Shoot is some 180 feet long by 4 feet wide and was drilled to be possibly sufficient to maintain a 100 ton mill (regarded as the minimum tonnage requirement) if the deposits continue to greater depth.

The best ore showings, known at present, are contained in diorite and coarse grained diorite of the Haileyburian Intrusives and consisted of altered replaced host rock, mineralized with pyrite largely and accompanied by quartz veinlets in varied but in general small amount. A considerable part of the alteration and replacement of the host rock would seem to consist of the development of albite and the nearly complete disappearance of all dark minerals; there is some silicification and carbonatization. Veins Nos. 1 and 2 at least seemed to be essentially similar to the Main showing on the McLennan Property [Figure 5, Chart A, back pocket].

Another type of gold occurrence on the property and not of economic importance consists of irregular gold bearing veinlets in a porphyry dike as in the northeast corner of claim K10005. Other types of structure on the group which might carry gold are sheared carbonatized zones, as in the southeast part of K10002 where the Sylvanite trail comes to a northerly flowing creek and quartz veins of which chalcopyrite bearing veinlets in diorite on the northeasterly projecting point east of the Sylvanite Camp are small examples.

Mineralogy

Minerals associated with gold deposition of the group are as follows: Gold: Visible gold has been found at Vein Nos. 1 and 6 at least; the present writer saw a little gold in a 1/10 inch veinlet at No. 1 Vein but Dr. A.M. Bell informed him that the visible gold was most usually found in slightly reddish, silicified areas.

Pyrite is the most abundant sulfide; it occurs as cubes and irregular areas in somewhat uniform disseminations and in minor discontinuous streaks making up to an estimated 10 percent of the white to greyish alteration areas but usually 2 to 4 percent.

Chalcopyrite occurs in very minor amount.

Leucoxene-ilmenite-magnetite occur to some extent as remnants in part of the

ore. At Vein No. 1 pyrite clustering around such remnants suggested that they had been partly replaced by it.

Individual Gold Occurrences: Vein No. 1 – the best ore showing and the first discovered is situated in claim K9992. . . . The strike is about N60E, but is not regular, and the dip is steep. The contacts of the white alteration are rather abrupt; in the trench over D.D.H. No. 1 white replacement is 3½ to 4 feet wide and show the original large quartz grains of the coarse grained diorite. Pyrite mineralization up to a roughly estimated maximum of 11 percent is in fine up to 1/10 inch grains, irregular to cubic, disseminated and in irregular aggregations. Thin sections T-162 and T-185 were taken from here as well as polished specimens TP-3. In the trench over D.D.H. No. 8 alteration occurs as lenses in fissile schist (after a feldspar porphyry dike) for some 7 feet followed by streaky sheared coarse grained diorite. The structural disturbance followed by this ore occurrence is not a regular linear one.

Vein No. 2. In general there is no strong structure here; in places it is a mere series of cracks with replacement along them.

Vein No. 3 is situated in the southern corner of Claim K10010 and quite close to the east contact of the diorite. The strike is about N68E. The showing has been explored by a few trenches through slight overburden; rather slight fracturing with scattered whitish alteration and pyrite mineralization is exposed. This showing appeared to be too small for profitable working.

Vein No. 5 occurs in Claim K9993, on the trail from Noranda camp to Vein No. 1. Varied amounts of quartz veins occur in a rude shear of varied intensity striking N61E and traceable for 150 feet cutting through diorite. Apparently only low values were obtained in sampling.

Vein No. 6 occurs about the middle of Claim K9993; white gray alteration mineralized by pyrite occurs in diorite host rock and has been explored by trenches and diamond drilling. Pyrite to about 8 percent occurs in grains up to 1 mm (usually about 0.3 mm) disseminated and in discontinuous veinlets; the appearance apparently gives little indication of the amount of gold present. Visible gold occurs here. Thin sections T-183 and 184 are to be made from this alteration. In places the alteration is cut through by small, less than ¼ inch, unmineralized carbonate and quartz veinlets.

Vein No. 10 on the west side of Claim K9992 seemed typical alteration as at Vein No. 1 but is reported not to carry gold in worthwhile amount.

Occurrence on Claims K10000 and 9997: This is the direct extension of the Main Showing on the McLennan Group. Although the typical alteration is present no worthwhile assay returns were obtained.

Occurrence on Claim K10005 Quartz veinlets up to 2 inches wide, some coarse white, others dark and with tourmaline, intersect a quartz porphyry dike about 20 feet wide and striking S74E through lava. Gold has been found in the veinlets. A minor amount of blasting has been done.

Occurrence on Claim K10000 at the east shore of a little lake a gold occurrence is reported; magnetite is said to be associated. The occurrence was not visited by the writer.

Occurrence of amphibole asbestos in Claim K9996 J. Kenty discovered an occurrence of amphibole asbestos a few feet from the west line and some 150 feet north of No. 3 Post. The asbestos is light gray-green, up to 3 inches long and perpendicular to the vein: some carbonate is associated. The occurrence is not in large enough amount to be of possible economic importance. The asbestos occurs in the Haileyburian Intrusive, near the contact, between gabbro and diorite.

G.E. McLENNAN (19)

The McLennan Group consists of nine claims K10024 to K10032 situated about one mile (1.6 km) south of the southwestern end of Dogpaw Lake.

Cedartree Lake Area

The following discussion of the history of the claim group is from a report by R. Thomson, Resident Geologist at Kenora (1947):

> After the discovery by J. Kenty and Roy Martin (for Noranda Mines) of the gold occurrence in Claim K9992, near the south end of Dogpaw Lake interest in the prospecting possibilities of the adjacent area was aroused. Mr. G.E. McLennan staked the group of 9 claims, south of and tying on to the Noranda claims, in the spring of 1944. During the course of staking he discovered a one inch quartz vein giving an assay return of 0.3 ounce of gold per ton. Sylvanite Gold Mines Limited secured an option shortly after the claims were staked and prospecting was undertaken by Mr. A. MacDonald and Mr. A. Gauthier. In a short time the "Main Showing" in the northeast corner of claim K-10025 was discovered. At the discovery point visible gold was found in noteworthy amount with the result that a program of trenching was carried out during 1944. In late 1944 and early 1945 fourteen diamond drill holes were put down along the Main Showing. Later in 1945 Sylvanite Gold Mines Ltd. relinquished their option and no work has been done on the property since then. Work on the property to date has been confined almost exclusively on the Main Showing in Claim K-10025 and its extension into K-10029 to the south; a carbonated zone in claim K-10029 about 1,200 feet east of the Main Showing discovered by A. G. MacDonald is reported to carry gold but it has not been systematically investigated. The property as a whole has not been prospected to date.

The surface geology of the claim group consists of metabasalt with minor mafic tuff overlain by a 3,200 feet (975 m) thick mafic-ultramafic sill (150 feet (45 m) peridotite-pyroxenite, 3,050 feet (930 m) gabbro). The contact between the metavolcanics and the sill trends just east of north. The metavolcanics are also intruded by quartz porphyry dikes. Gold mineralization appears to be associated with quartz-carbonate veins in shear zones. The metavolcanics are folded into an isoclinal anticline-syncline structure with a steep easterly dipping axial plane that trends to the northeast. The folded limbs are up to 1,200 feet (365 m) apart (Figure 4, Chart A, back pocket).

The following discussion of the economic geology of the claim group is from R. Thomson (1946):

> Economic Geology
>
> Gold is the only mineral known to occur on the property in economically promising amount. Work done to date is very largely the testing by trenching and diamond drilling of the Main Showing in Claims K10025 and K10029 to the south; the rest of the group does not appear to have been prospected [Figure 5].
>
> Main Showing
>
> The Main Showing is situated on top of a northeasterly trending hill and overburden is in general slight. Trenching was done for the most part using an x-ray diamond drill for blast holes. Inclined holes with maximum 3 to 3½ ft. burden were drilled. Clean, satisfactory trenches resulted and the drill core was saved for assay.
>
> Gold disposition at the Main Showing is associated with the alteration and replacement of greenstone by albite, quartz and carbonate with quartz carbonate veinlets along fracture zones; with disturbance of slight intensity. Mineralization is largely by pyrite; minor chalcopyrite occurs. Minerals associated with gold deposition are as follows:
>
> Gold In addition to the gold presumably associated with pyrite, visible gold, reportedly in considerable amount was found in Trench 1 [Figure 4, Chart A, back pocket], the discovery point of the showing. Visible gold is also reported to have been found in small amount in Trench 6. In general the presence of visible gold is unusual. Pyrite is the most abundant sulfide associated with gold deposition and accompanying alteration but the amount of pyrite is not proportional to the amount of gold. Pyrite, in estimated average amount of 2 to 3 percent varies to about 10 percent occurring as disseminations and irregular veinlets; although

occurring largely in the whitish altered rock in places it is also in the seemingly unaltered greenstone. The usual range of grain size is 0.1 mm to 1 mm. In thin section T-164 (from Trench 2) well shaped pyrite crystals to 1 mm occur in the areas between the irregular replacement veinlets of quartz, albite and carbonate; the veinlets are fringed by irregular pyrite grains of about 0.02 to 0.07 mm size. Chalcopyrite is present in amount estimated at less than ¼ percent. In Trench 2 splashes of chalcopyrite were seen along quartz veinlets, less than ⅛ inch wide, cutting through and seemingly younger than the alteration; chalcopyrite seemed also to occur associated with the main alteration as opposed to the veinlets.
Magnetite-ilmenite-leucoxene The alteration of the magnetite-ilmenite grains to leucoxene seemed quite complete in the alteration associated with gold deposition.
Albite A considerable part of the alteration appears to consist of the development of albite in the greenstone, although the amount formed from the original rock as opposed to that introduced is not known. In thin section T-164 from Trench 2, the albite was of two varieties, one showing numerous inclusions (and minor veinlets) of white mica and carbonate, and other being inclusion free and either in or adjacent to replacement veinlets also containing quartz and carbonate.
Quartz Quartz, as shown in thin section T-164 from Trench 2, occurs, in irregular quartz-albite-carbonate replacement veinlets in the alteration and as irregular grains (possibly in part original constituents of the greenstone) in the alteration. It is in smaller amount than albite. In hand specimen much of the alteration appears to be composed to quartz but this appearance was not borne out by thin section T-164. Distinctly later quartz veinlets in places bearing chalcopyrite, cut through the alteration.
Carbonate Carbonate occurs very roughly estimated 15 percent (thin section T-164) in the altered zone; it occurs as disseminated grains and also with quartz and albite in irregular replacement veinlets.
Chlorite and Serpentine (?). In the alteration zone, the original dark minerals of the greenstone have almost completely disappeared being apparently represented by small patches of chlorite (see in thin section T-164) and by irregular oval patches to one inch long of light waxy green mineral resembling serpentine at Trench 2.
Tourmaline In a few of the quartz veinlets (usually ⅛ inch or less) cutting through the altered zone, small, black needles believed to be tourmaline, were seen.

Attitude

The Main Showing has a strike about N46E and a steep easterly dip. Disregarding assay returns and considering alteration and mineralization the zone has been traced definitely from at least 150 feet northeasterly of the north boundary of the McLennan Property (that is on Claims K-10000 and K-9997 of Noranda ground), southwesterly to Trench 9 on McLennan ground, a distance of 650 feet. The presence of the zone farther to the southeast is indicated but work done is not extensive enough to show the relations clearly.

The zone in its course cuts across a minor anticlinal structure [Figure 4] and is somewhat parallel, although not coincident with the anticlinal axis. From Trench 5 northeasterly the host rock is fine grained to medium grained massive greenstone. No structures typical of lava were seen by the writer and this rock may be either a flow or an intrusive. If intrusive, it does not seem to be related to the Haileyburian intrusives. Southerly from Trench 5 to Trench 9 the zones cut across massive andesitic lava, in part showing pillows. Immediately south of Trench 9 the zone strikes obliquely across a feldspar porphyry dike, which appears to be younger than ore deposition. From Trench 9 southeasterly comparatively little work has been done in tracing the zone; if it continues along its strike it would intersect interbanded tuff, agglomerate and lavas. The effect of these different host rocks on alteration and gold deposition is not known.

Zone in detail

Considering the zone in more detail it will be noted from [Figure 5, Chart A,

back pocket] that from the vicinity of Trench 3-N northeasterly to the north boundary of the property there are two alteration bodies parallel and about 50 ft. apart. The trenching and diamond drilling done on this part has not given encouraging results; although the widths of the alteration are up to 20 ft. the assay returns without exception are far below commercial grade.

From Trench 3-N to Trench 1 the overburden, boulder clay with large boulders, is too deep to permit trenching; Drill hole No. 12, according to its log, did not intersect the alteration zone. This part of the zone may be regarded as untested. From Trench 1 southerly to Trench 4, a distance of some 180 feet is much the most important part (so far as known) of the zone. The samples from the trenches gave much higher returns than from the drilling. This is the best exposed part of the whole length of the zone. The alteration and mineralization does not follow any marked structural disturbance but is related apparently to irregular fracturing in the massive host rock. From Trench 1 to Trench 3 alteration appears to be continuous but from Trench 3 to the group of 3 small trenches the alteration diminishes markedly as though in process of pinching out. In Trench 4 alteration is exposed over a width of some 7 ft. but in about 20 feet to the north appears to end. These observations suggest the zone might be made up of unconnected lenses. A small easterly-westerly shear cuts across the alteration zone at Trench 1, with the north side being displaced a few feet to the east; a similar shear but with associated carbonate passed through the three small trenches south of Trench 3. The alteration varies in intensity; at Trench 2 completely replaced rock occupies the eastern part of the trench but the western part shows partial replacement with irregular, often angular, fragments of the host rock.

In Trench 1 in places white completely altered rock is in sharp contact with greenstone; in other parts of the trench irregular alteration veinlets fringe out into unaltered rock.

South of Trench 5 to Trench 9 some shearing appears to be associated with the alteration; the assay returns obtained are below commercial grade. About 20 feet northerly of Trench 5 the body of alteration seems to pinch out.

From Trench 9 southeasterly insufficient work to determine the merits of the zone has been done. In Drill Hole 2 assays of the core over 3.5 feet gave average returns of 10.74 d.w.t.s of gold per ton.

Other Gold Occurrences

In claim 10029 on the hill south of the easterly-westerly swamp area in the northern part of the claim gold occurrences have been discovered but not thoroughly tested. A panning of soil from near Trench 16 by the writer yielded a good tail of gold.

On [Figure 5] the position of several northeasterly striking carbonatized shear zones are shown; these were very briefly examined by the writer. Carbonatization seemed to be much the most important alteration; on the northwest side of Trench 12 it has a light green colour.

In the central part of Claim K10026 a northerly striking shear zone with carbonatization and some silicification occurs. Gold is reported to occur in it but very little work has been done. Bright green chlorite occurs in this locality.

MEAHAN OCCURRENCE (20)

The claim group is located southeast of Flint Lake and north of the Stephen Lake-Flint Lake portage. The group consisted of claims K10523 to K10527.

The surface geology of the area consists of east-west-trending metavolcanic, mafic and ultramafic rocks. These rocks are all disrupted by a major zone of shearing that trends east-southeast. In the northern part of the property, an area of metabasalt is underlain to the south by a zone of highly altered and sheared gabbro, and then by a

zone of intense shearing. The rocks in the shear zone are soft, very schistose, rusty-coloured and spotted with quartz veins. South of the shear zone are encountered a block of sheared chlorite-rich gabbro and a peridotite remnant. Passing further south, a zone of altered felsic to intermediate tuff and lapillistone are overlain by a gabbro-peridotite, pyrozenite sill and a thickness of well-bedded felsic tuff and lapillistone. The entire sequence mentioned above is intruded by a southeast-trending diabase dike.

Minor gold mineralization occurs with pyrite mineralization and with quartz veinlets in carbonatized shear zones. J.B. Meahan reported on some grab samples from a quartz vein in an old pit in the southwestern corner of K10519. The samples had an estimated 6 percent chalcopyrite, some pyrite and yielded gold on panning.

In claim K10518, about 200 feet (60 m) or 300 feet (90 m) north of Post 2, visible gold was reported to occur in some quartz veinlets with carbonate altered margins.

Large pieces of mineralized float were found in the southwestern quadrant of Claim K10514. The float was considered by R. Thomson (1944c) to have an in situ derivation from an area about 10 feet (3 m) to 12 feet (3.6 m) wide. The pieces of float were silicified and contained various amounts of coarse grained pyrite (up to 0.2 inches (5 mm) across) ranging up to about 10 percent of the rock. Assay results for gold were reported to have been positive for some samples and negative for others.

In Claim K10513, pyrite mineralization in a shear zone was reported south of the 750 foot (230 m) mark on the picket line between K10513 and K10514. R. Thomson quoted a confidential source reporting a 1 inch quartz vein with a gold value of 2 ounces per ton. Also in claim K10513 about 310 feet (945 m) along the picket line, six trenches exposed pyrite mineralization in a shear zone. The pyrite cubes were up to 0.2 inches in size, up to 25 percent of the rock volume and were reported to be gold-bearing. In the southwestern quadrant of claim K10513, small lenses of pyrite in a shear zone were reported to contain small amounts of gold.

A chalcopyrite bearing quartz vein is reported, exposed in an old pit about 125 feet (38 m) south of the western end of the Flint Lake-Stephen Lake portage. The showing occurs in highly sheared gabbro.

MILLREE OCCURRENCE (21)

The property was located north of Peninsula Bay of Kakagi Lake and extended east to Weisner Lake. It consisted of 31 claims: K10872 to K10891, K10900 to K10908, and K10959 to K10960.

The property was optioned by Sylvanite Gold Mines Limited from the Millree Prospecting Syndicate in 1945. Sylvanite was interested in the mineralization associated with the felsic porphyry dikes that occurred in the area.

The surface geology consists of massive intermediate tuff and bedded dacitic tuff that are intruded by two gabbro-peridotite, pyroxenite sills and by large and small quartz and quartz-feldspar porphyry dikes. The area has been folded and faulted. Gold mineralization has been found associated with carbonatized siliceous transverse fractures in the southern sill.

G.L. Holbrooke (1945b) reported on the property to Sylvanite Gold Mines Limited

and the following discussion on the economic geology of the property is extracted from his report:

> The property is underlain by a thick series of massive tuffs with occasional banded horizons. These rocks have been intruded by a sill-like mass of diorite from 1,000 feet to 1,500 feet thick and by a later quartz porphyry dike. The tuffs are folded but have a general trend of N55W. The diorite also follows this trend but the porphyry strikes about N70W and has a width of about 500 feet.
>
> Originally the property was optioned on the strength of results that Noranda was getting from a narrow but persistent vein that followed closely the North porphyry contact. Here for a length of over 600 feet bulk sampling gives an average of 2.0 ounces across a width of 2.0 feet. The only further work possible for Noranda was shaft sinking on this vein. This they are unwilling to do because of the small tonnage indicated and they have stopped work.
>
> An attempt was made to trace the Noranda vein across our property but the vein apparently lies in a long straight depression and nowhere is the vein exposed or trenching feasible. Diamond drilling is the best means of locating this structure but in view of the high grade nature of the occurrence, assay results would not be reliable. A limited amount of work was done on two narrow veins (No. 3) occurring in the porphyry on Claim 10905, along the valley edge but no results of interest were obtained.
>
> In claim 10902 [Figure 6] and parts of adjoining claims prospecting has located a series of "breaks" in the diorite sill, striking from N15 to N30E. These breaks are apparently transverse fractures caused by movement roughly parallel to the diorite contacts that developed in the relatively brittle diorite. They may extend a short distance beyond the diorite into the banded tuffs but so far they have not been picked up there.
>
> These breaks are now the loci of zones of alteration and mineralization and considerable trenching has been done in an attempt to determine whether or not any of them carry mineable ore bodies. These veins are described below.
>
> No. 2 Vein occurs near the west side of Claim 10902. It has been cross-trenched and X-ray drilled for a length of 300 feet and consists of a strong silicification and carbonate alteration, heavily mineralized by pyrite. It shows a width of from 5 ft. to 14 ft. but assay returns from deep channel sampling are only low, as shown. The vein strikes N16E and dips 70 degrees west. It is entirely in diorite.
>
> No. 4 Vein is parallel to No. 2 and lies 300 feet to the west of Claim 10903. It consists of a 2 feet wide vein of black smoky quartz carrying sparsely disseminated pyrite. It has been opened up in only one trench where grab samples returned 48.60 dwts. but where later channel sampling showed only trace.
>
> No. 5 Vein lies 950 feet SE of No. 2 Vein and is similar to it in character and attitude. It consists of a strong carbonate alteration in diorite across a width of about 12 feet with the altered zone and the immediate wall rock cut by numerous irregular quartz stringers and veinlets. The carbonate is well mineralized by fine pyrite and several of the quartz stringers pan gold. It has been possible to open up this zone in only two trenches about 50 feet apart as shown. It will be seen that the more northerly trench shows several assays, all across 2.0 feet, that are of interest and which average 3.40 dwts. across 10.0 feet. The next trench south shows only one assay of 2.80 dwts. across 2.0 feet while the third trench did not reach the zone. These values are not spectacular but they are sufficiently interesting to warrant further work. Such work in this case is most easily and cheaply done by diamond drilling and six short holes totalling about 1,000 feet are recommended to explore the zone about 75 feet below surface along its strike.
>
> No. 6 Vein lies about 180 feet SE of No. 5 Vein and is parallel to it. It consists of weakly carbonated zone 8 ft. wide carrying about 30 percent quartz veinlets and stringers and fairly well mineralized by fine pyrite. Two trenches were dug here but results were very low and no further work is contemplated.
>
> No. 1 Vein lies in the banded tuffs just outside the diorite contact and about 450 ft. north of the last exposure on No. 2 vein. It consists of a 2 ft. wide

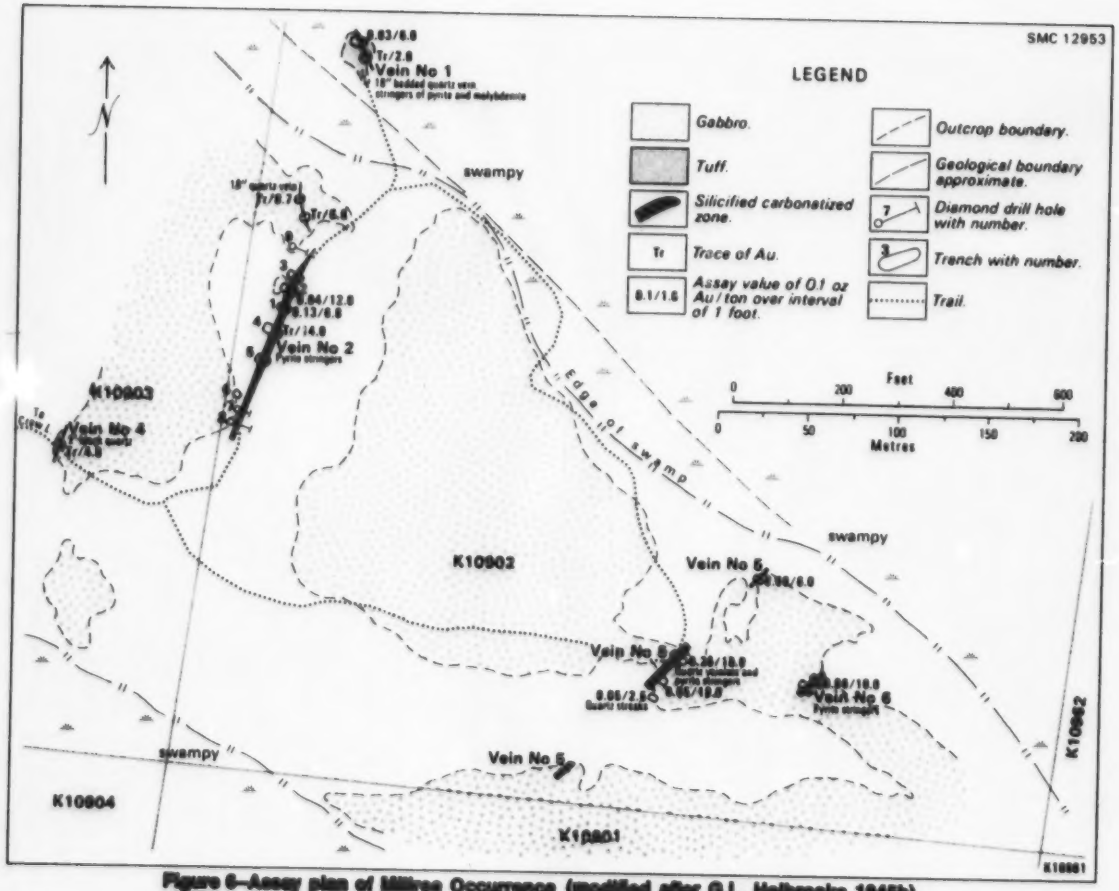


Figure 6–Assay plan of Millrose Occurrence (modified after G.L. Holbrooke 1948b).

banded quartz vein striking N30W and dipping 75 degrees west. It is conformable with the surrounding bedded tuffs and is fairly well mineralized by pyrite and fine dusty molybdenite. It is opened up in two trenches 60 ft. apart but all sample returns are low and the vein is not worth further work.

The Eastern claims of the group have not yet been prospected but it does not seem likely that anything of interest will be found except possibly on claims 10878 and 10877 which are about 700 ft. west of the west edge of a small NW trending mass of granodiorite. If nothing is found on these claims then the only showing of possible interest is No. 5 Vein and here 1,000 ft. of drilling will tell whether or not further work is justified.

ROBERTSON OCCURRENCE (22)

In 1944, E.M. Robertson and Company held four groups of claims west of Cedartree Lake and north of Kakagi Lake (R. Thomson 1944d).

The first group consisted of nine claims: K10752 to K10760. Assays for gold were taken of numerous large pyritized float on the shore of the lake, but the values were very low.

The second group of claims lies on the western side of Cedartree Lake about ½ mile northeast of the Cedartree Lake-Kakagi Lake portage. It consisted of four claims: K10615-18. The point of interest was a silicified carbonatized zone about 25 feet (7.6 m) wide that was enclosed in massive gabbro. Six diamond drill holes totalling 150 feet (48 m) in length were drilled and assay returns from the core were very low, the highest value being 0.04 ounce gold per ton over 5½ feet (1.67 m).

The third group of claims lies about ½ mile (800 m) north of the northern arm of Emm Bay. It consists of eight claims: K10043 to K10046, K10056, K10061 to K10063. The main showing consists of a northeast-trending silicified carbonatized pyrite-bearing zone in gabbro. Channel sampling resulted in very low assay values for gold.

The fourth group consisted of 13 claims: K10018-23, 10040-42 and 10048-51. It was located about midway between the third group and Dogpaw Lake. No information at all was reported about any mineralization or work done on the property.

SEWELL OCCURRENCE (23)

The property is located on the western side of Flint Lake, north of Cedartree River and adjoining the northern edge of the Caswell-Williams claims group. It consists of the following claims: K10065, K10066, K10069, K10070, K10540 to K10545; K10780 and K10781. In addition to the main group is a group of two claims which are located south of the Martin-Kenty Dogpaw Lake claim group, K10067 and K10068.

The surface geology consists of a 3,200 foot (975 m) thick gabbro sill overlain to the southeast by intermediate tuff, lapillistone and tuff-breccia. Quartz and feldspar porphyry dikes are numerous in the northern part of the claim group, where the two main showings of gold mineralization occur. The rocks of the area southeast of Dogpaw Lake (were probably mafic in composition originally) but are now intensely altered and sheared. The major shear zone extending through Dogpaw Lake, Flint Lake and north of Stephen Lake passes through the northern part of the claim group. The

mineralization on the property consists of gold associated with pyrite in a shear zone located at the northern edge of a quartz porphyry dike.

The showing was originally found by L. Turcotte in 1943 while prospecting for Noranda Mines Limited, but first exposures did not appear to be promising. E. Sewell staked claims covering the area of interest and optioned them to Sylvanite Gold Mines Limited in the summer of 1944. Sylvanite did trenching on the property and their results are discussed in the following excerpts from a report by G.L. Holbrooke (1945c):

> During the summer of 1944 the claims were prospected and two showings were found. The No. 1 showing consists of a quartz carbonate vein from 1 ft. to 3 ft. wide striking east-west near the north west corner of claim 10542. This vein was blasted into and sampled with negative results.
>
> The No. 2 showing [Figure 7, Chart A, back pocket] was found in the strong shear zone referred to above crossing the South part of claim 10070. During 1944 this zone was trenched in several places and Nos. 1 and 3 trenches were blasted across and samples with the results shown on the plan dated November 5, 1944. These were encouraging and during the past summer a total of ten trenches were blasted across the zone and heavy channel samples taken. The results are shown on the plan dated November 5, 1945.
>
> All of this work has shown a zone of strong pyrite mineralization in the shearing mostly along the north contact of a quartz porphyry dike. This mineralzation varies in width from 8 ft. to 21 ft. and has been cross trenched for a length of 600 ft. There is a fairly heavy carbonate alteration associated with the mineralization and a very few irregular quartz and calcite stringers were noted. Gold has been panned from the roasted sulphides from every trench and a little fine visible gold was found at the South end of No. 1 trench.
>
> Grab samples of the best looking material from trenches 1, 2, 3 and 8 have assayed from 5.50 to 13.20 dwts. but the results of the channel sampling are very low as shown. It is possible that bulk sampling would find better results and I would suggest that this be done if Noranda's work on a similar showing on the adjoining property proves important.

R. Thomson, Resident Geologist of Kenora, also reported on the property (1945c) and his discussion of the economic geology of the property is quoted below:

> Gold is the only mineral known to occur in economically important amount.
>
> The only showing, known to date is one claim K10070, some 600 ft. easterly of the east end of Dogpaw Lake and on a low hill on the south side of the swamp. The showing has been traced for some 900 ft.; a picket line along it runs about N80W; and is about 365 ft. north of No. 2 Post. Claim 10070, the post being located on the shore of Flint Lake. The shearing has a northerly dip of some 75-80 degrees.
>
> The showing consists of a pyritized shear zone, with mineralization over widths of up to 30 ft. in places; alteration makes identification of the original rock uncertain but it appears to have been a tuff most probably. The rock on the north side of the sheared zone is agglomeratic and contains white fragments up to several inches. In the sheared zone lenses of fine grained magnetite in widths up to 3 or 4 inches may be seen. A white acidic dike occurs on the south side of the sheared zone. The sheared zone is rather dark grey green; it is chloritic. Minor silicification and a few irregular quartz veinlets may be seen in places. Pyrite occurs in varied amount from an estimated 1 to 8 percent, in cubes and irregular area up to about 1/10 inch. The appearance does not give a good indication of results to be obtained by assay. Some samples giving high assay returns are not striking in appearance and the surface outcrop is quite inconspicuous for the most part. A grab sample taken by the writer gave an assay return of 0.84 ounces gold per ton but the results of sampling are reported to be quite variable. In a few places fine grained visible gold has been found.
>
> In one trench a small nearly vertical slip, with strike about N20E contains specular hematite up to ½ inch wide with carbonate crystals and alteration adjoining over a width of about one inch.

Cedartree Lake Area

Work on the property was suspended in late 1945. R. Thomson (1945) also reported on the two claims south of Martin-Kenty claim group, K10067 and K10068. An excerpt from his report follows:

> In K10068 at the first dam above Cedartree Lake, a shearing striking a little north of east, with pyrite and some alteration, cuts through tuffs and volcanic fragmental rock. The shearing is gold bearing.
>
> Mr. P. Williams who is part owner of the Caswell-Williams group, adjoining to the east, reported that sampling returns on the east side of the river averaged $2.22 (at $35.00 per ounce) gold per ton over a width of 45 ft. It is reported that some shallow diamond drilling was done in this vicinity in former years.
>
> Mr. Roy Martin and Jack Kenty did a little stripping on the east side of the river and obtained low values, reportedly $2-$3 in sampling. In 1944, Mr. A.H. MacDonald, for Sylvanite Mines, did a little X-ray diamond drilling and shallow trenching also on the east side of the river. The results are unknown to the writer.

SELCO OCCURRENCE (24)

In 1968. Selco Exploration Company Limited investigated four diamond drilling targets in the map-area. Two of the targets were south of Cedartree Lake, one was south of Little Stephen Lake and the last was north of Kakagi Lake.

Three diamond drill holes were drilled in claims K-39572 and K-42208 south of Cedartree Lake. The holes totalled 1,227 feet (374 m) in length and all three of them encountered interbedded sediments, felsic tuff and agglomerate. Thin pyrite-pyrrhotite bands along with irregularly disseminated pyrite and pyrrhotite grains occurred to a minor extent in the two drill holes in K-39572.

Two diamond drill holes were collared south of Cedartree Lake in claim K39581. The drill holes both encountered dacite and totalled 227 feet (69 m) in length. One of the diamond drill holes encountered a 10 foot (3 m) section composed of very fine grained dacite containing several irregular sulphide patches comprised of pyrite, pyrrhotite, and sphalerite. A 5 foot (1.5 m) core sample from this section assayed 0.04 percent copper and 1.18 percent zinc (Regional Geologist's Files, Ontario Ministry of Natural Resources, Kenora). The other drill hole yielded a 16 foot (4.8 m) section consisting of banded rhyolite which contained a 1½ inch (3.8 cm) vein of solid chalcopyrite. Disseminated grains and irregular veins of pyrite, pyrrhotite, (±) chalcopyrite, (±) sphalerite occur through the dacite.

In 1968, Selco drilled two holes in the area south of Little Stephen Lake. The holes totalled 503 feet (153 m) in length and both encountered gabbro underlain by dacitic tuff. Minor mineralization was located in one of the drill holes in a section consisting of stringers and veinlets of sulphides within a graphitic shear zone. A 26-inch (66 cm) core section assayed 2.30 ounces of silver per ton, 0.26 percent copper and 2.97 percent zinc.

North of Kakagi Lake, Selco collared one diamond drill hole totalling 318 feet (97 m) in length. The drill hole mainly encountered interbedded felsic tuff and agglomerate with minor irregularly disseminated pyrite and pyrrhotite.

ZEEMEL PROSPECT (25)

The claim group lies on the southern side of Flint Lake and on the northern side of Cedartree Lake and includes the former Caswell-Williams group. The group consists of 21 claims: K42379 to K42380; K42383 to K42390; K42848, K42851 to K42860. A magnetometer survey and an electromagnetic survey was done on the property.

In a report of Gunnex Limited, W.F. Dix (1969) mentioned that the electromagnetic survey had determined two noteworthy anomalies. The following discussion about the anomalies is extracted from his report:

> Two anomalies of note were recorded. The first lies about 500 ft. north of the Falnora shaft and lies subparallel to the shaft shear zone. Examination of dip angles indicates a possible south dip for the conductor. The anomaly is quite distinct over a 2,000 ft. length. This anomaly may represent a pyritized shear zone and if so could be gold-bearing [Map 2319, back pocket].
>
> The second anomaly lies 300 to 400 ft. north of the south shoreline and within the lake. It too is about 2,000 ft. long. A patch of open water on section 32E precluded confirmation of the anomaly where it probably crosses this line. The anomaly could represent a mineralized portion of a fault zone, or parallel structure, striking at an acute angle to the northeast trending magnetic anomaly. It could also represent a steepening of the shoreline with a high angle contact between rock ledge and lake bottom deposits [Map 2319, back pocket].

Suggestions for Future Mineral Exploration

Surface exposures of bedrock are abundant in the map-area, and as a result, through surface prospecting may yet yield returns of economic mineralization. Geophysical methods employed in the search for gold mineralization should mainly consist of electromagnetic surveys to delimit any sulphide conducting mineralization associated with the gold. A geophysical search for copper-zinc mineralization should employ ground magnetometer surveys to delimit pyrrhotite. Copper mineralization should be searched for by electromagnetic surveys.

Mineral exploration targets in the map-area include the following:

—a diamond drill investigation of the EM conductors in the southern part of Flint Lake for gold bearing mineralization;

—a diamond drill investigation of the EM conductors in dacitic tuff about 1,500 feet (450 m) south of Little Stephen Lake for copper-zinc mineralization;

—a geophysical and diamond drill investigation of the sulphide occurrence in dacitic tuff about 3,500 feet (1,050 m) south of Stephen Lake and 2,000 feet (610 m) west of the major diabase dike for copper-zinc mineralization;

—geophysical investigation of the major fault zone beneath Dogpaw Lake, Flint Lake and Stephen Lake for gold mineralization;

—a geophysical investigation of the faults along the faulted portion of Sill No. 3 and into the surrounding dacitic tuff south and southeast of Cedartree Lake for remobilized copper-zinc mineralization.

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